

BlueBook

**MARCH 1941** 

# HOLDEN

HEAT \* TREATING \* BATHS

Step up ion



SEND FOR NEW

35 XXXX

### A Specific Bath for Any Type of Work up to 2400°F.

TEMPERING
200° + 1100° F.
HARDERING 1240° - 2000° F.
(For Teol Steels, Billey,
Steels, Fraduction Steels)

(RSE MARDERING - 1200 - 1700 -

### OTHER HOLDEN BATHS FOR

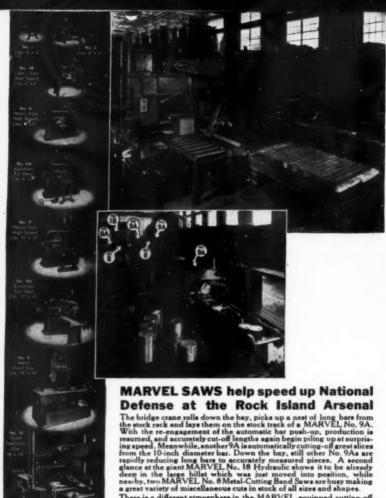
Point Annealing of Shells ... Heat Treating Aluminum Alloys ... Scale Free Forgings

#### YOUR PROBLEM

Your specific preaton was have been solved already by our Research Staff. The answer and procedure is in our files, available immediately

#### COMMERCIAL PRODUCTION DEPARTMENT Send tools or write for name of nearest Commercial Heat Treater using Holden Baths

THE A. F. HOLDEN COMPANY, New Haven, Conn.



a great variety or macetianneous cuts in stock of all sizes and anapes. There is a different atmosphere in the MARVEL equipped cutting-off department... none of the endless "plugging along" that one used to associate with hack sawing. Instead, smooth running high-speed production... real output with modern high speed, all ball-bearing equipment Because no other accurate cutting-off method can equal MARVEL SAWS in speed, dependability, or low cost per piece, they are being widely used in speeding up the great National Defense Program.

### ARMSTRONG - BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave., Chicago, U. S. A.

Eastern Sales Office: 199 Lafayette St., New York







Scientifically heat treated to a true spring temper, "Rivett Mark" collets resist wear and hold their spring loner than collets of any other make. As standard equipment on all makes of lathes and millers, (see Rivert Bulletin 1008) they may be ordered for im-mediate delivery from the following

### CHICAGO

R. E. Ellis Engineering Co.'
565 W. Washington Blvd.

#### DETROIT

Charles A. Strelinger Co. 149 E. Larned Street

### BOSTON

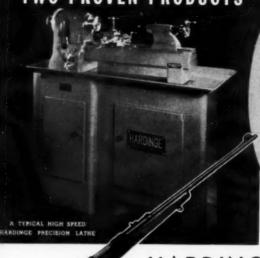
Rivett Lathe & Grinder Inc. 18 Riverview Road, Brighton

RIVETT LATHE & GRINDER INC.

Spring tempered

COLLETS

### TWO PROVEN PRODUCTS





WINCHESTER MODEL 78 BOLT ACTION

REPEATING RIFLE

### HARDINGEAND WINCHESTER

hit the "Bulls Eye" for performance

The Winchester Repeating Arms Company have selected Hardinge modern machines to play an important part in their production program,

hecause . . .

the high quality, quick action and accuracy of all Winchester Arms, demanded the same characteristics in the machines used in their manufacture.

Ask for a Descriptive Bulletin

### HARDINGE BROTHERS, Inc., ELMIRA, N. Y.

PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE



# This "Spring" ARMSTRONG TOOL HOLDER cuts smooth threads in the toughest steels

Even the toughest steels can't "snag" or break an ARMSTRONG Spring Threading Tool, for this "gooseneck" tool holder will "duck" rather than dig-in when it strikes a hard spot. It will cut smooth, accurate threads or a fine finishing cut in steels that tend to tear or climb up on and break a rigid tool.

It's a convenient tool too, for it takes cutters quickly ground from standard square shaped high speed steel, and holds them in any of 3 positions for "straight" "tight hand offset" or "left hand offset" approach to the work. It is both a spring tool or a "rigid" toolwill take a roughing cut or do an ordinary turning job as a rigid tool, and with the turn of a plumb nut, it becomes "spring" tool which many machinists consider helpful in obtaining a smooth finishing cut or thread in extremely tough alloy sleels.

Wherever they are machining the new tougher steel, the ARMSTRONG Spring Threading Tool is one of the busiest tools in the shop. It answers a lot of machining problems.



ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

308 N. FRANCISCO AVE. CHICAGO, U. S. A.

Eastern Warehouse and Sales: 199 Lafayette St., New York



### Machine Tool



Hitchcock Publishing Co., 508 So. Dearborn St., Chicago 31,500 THIS ISSUE

MARCH 1941

VOLUME 37, No. 3

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Converts your drill press into an efficient tool grinder . . . at small cost

o more waiting to sharpen and mill. No tearing down and etting up again of a job on the gular grinder. With the Roan rinding Fixture you slip the rbor of the grinding wheel into he chuck of any high speed drill ress—and hollow grind an end hill in 5 to 10 minutes, instead f half an hour.

THER FACING TOOLS

Simple to operate, needs no skilled labor. Even apprentices quickly learn to do precision jobs.

You save labor costs, time and money. No tool room bottle necks. Regular grinders are free for bigger jobs. Sharp end mills perform better, last longer and fewer are needed. A Roan soon earns its small cost.

Sold only through machine tool dealers. Write manufacturer for literature.

O 1941

ROAN MFG. CO., RACINE, WISCONSIN

### HEMISPHERE DEFENSE



begins here!

It begins at once with machines that must provide weapons for our armed defense. It can only continue in the future with machines that can manufacture products that command wide markets and permit Americans to continue earning adequate wages. Special machines built for defense work can only be junked, or written off, when the present emergency is over. Versatile, adaptable, standard Jones & Lamson equipment will meet many of your present requirements to the utmost advantage and still be available for retooling to earn welcome profits in the years to come. That's why it pays both ways to put your production problems up to Jones & Lamson engineers.

PROFIT PRODUCING





MANUFACTURERS OF SIDDLE & RAN TYPE UNIVERSAL TURBET LATHES FAX AUTOMATIC DIATRIC. AUTOMATIC DIRECTORY ACTIONS. AUTOMATIC DIAGRAM ACTIONATE CHIEF CARROLLING MACHINES. COMPARATORS. ATTAINGENT AND RADIAL, TEXTINDARY AND REVOLVING DIES AND CHI-SIRS.





### Are You Specifying "Norton Resinoid" for Your Portable Grinders?

BIG users of big snagging wheels run comparative tests—they have their own evidence of grinding wheel efficiency

—and the Norton Resinoid invariably holds a high record for low costs.

Now what about the wide variety of sizes and types of wheels for portable grinders? They're harder to check for comparative performance but just as important in the long run.

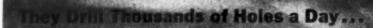
The same Norton research goes into them, the same abrasives and bonds. They are made by the same processes, same equipment, same skilled workers.

And the same Norton engineers are ready to help you get the right wheels for your portable grinding jobs. And you can get the same efficient, low cost operation.

NORTON COMPANY WORCESTER, MASS.

NORTON ABRASIVES

W-791A



# PRODUCTION IN A HURRY

### These Small, Fast.

TYPICAL OF MEN TODAY with a big production job on their hands, airplane makers have long shunned "droopy", inefficient drilling methods. They MUST have speed! And so the job has gone to Thor's "Speed-Up Squadron" of U14 type 1/4" Drills - the smallest, lightest portable electric drills ever built. Tremendously powerful, designed for the stiffest production service, they are nevertheless so compactly built, so extremely light in weight, that they provide the perfect ONE MAND operation . . . the "finger point" accuracy that insure fast, efficient drilling.



ONE HAND does the job with these small, fast, light THOR 1/4" DRILLS.

- 36 DIFFERENT MODELS
- DIFFERENT MOTOR SIZES
- DIFFERENT SPEEDS
- SWITCH STYLES
- RIGHT ANGLE TOOLS

Take A Tip From the Airplane Makers-

CAN'T WAIT FOR "DROOPY" DRILLING!

Drills Speed Up Every Job!

A FEW OF THE 36 DIFFERENT THOR U14 TYPE 14" DRILLS



INDEPENDENT PNEUMATIC TOOL CO.

600 WEST JACKSON BLVD. CHICAGO, ILLINOIS

TOOLS

Birmingham . Boston . Buffalo

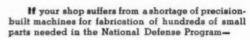
SEND FOR NEW THOR CATALOG.

INDEPENDENT PREUMATIC TOOL CO. \$12 WEST JACKSON BLVB., CHICAGO, ILLINOIS

Please send me the New Thor Catalog No. 37 describ-ing "i," Drills and other portable electric tools.

Company.





If production barriers are cropping up in your plant due to lack of enough machinery—

If your big machines are tied up because they have to handle both the large and small jobs—

Then you too can smash through these barriers. Duro tools, at a very low cost, will help restore the stream of materials to flow smoothly and continuously for you as they do for many other manufacturers.

There are many places in your shop where Duro Tools will take the place of your big machines to speed up the work going over your production line.

We can't tell you the whole story here but we invite you to visit BOOTH 120 during the A.S.T.E. Exposifion in Detroit — March 25 to 29. We'll be glad to discuss how Duro Tools will fit into your plant.

DURO METAL PRODUCTS CO.

DEPT. DEU

2649 N. KILDARE AVE., CHICAGO, ILL.

# Announcing the NEW.

### TORQ-QUA-MATIC

The Torq Multi-Stage Variable Speed Transmission is an individual "TORQ DRIVE" unit designed for modernization of machine tool equipment. Is built in standard stock units, compact and sturdy in design. Available in two speed ratios to meet practically all conditions of machine tool motorization. The standard 4 speed unit has conveniently located lever for selective speed changing.

Write for details and prices on this low cost money saving unit.



### TORQ MOTOR DRIVE

Some advantages of Torq drives are: Increased production up to 25% or more; greater operating efficiency of each machine; better arrangement of machinery for production and lighting; less floor space required—clear ceiling—cleaner, healthier working conditions; independent operation of each machine with fingertip control; old machinery rejuvenated. Purchase of new equipment often eliminated.

It will pay you to investigate these drives. If you have motorization problems, contact our Engineering Department. No obligation.

THE TORQ ELECTRIC MFG. COMPANY

# JARUI5

Flexible Shaft Machines

Flexible Shafting

Tapping Attachments

Quick Change Chucks & Collets

Ground from The Solid

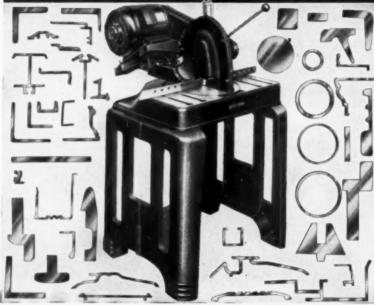
Rotary Files





THE CHARLES L. JARVIS COMPANY, MIDDLETOWN, CONN.

### Here's the Cut-Off Machine that can do these Jobs



### New DELTA Machine Cuts Non-Ferrous Metals With POLISHED SMOOTHNESS

The photograph above shows some of the actual shapes and sizes handled by the new Delta Cut-Off Machine. This remarkable unit is designed especially for cutting copper, brass, aluminum and other non-ferrous metals. It is equipped with a special high speed steel blade and oiling device which feeds cutting oil to the blade. It leaves the cut per-fectly smooth, thus eliminating additional finishing and polishing operations. Here is a powerful, accurate machine made available at a fraction of the prices customarily charged for machines of this type.

**CUTS THESE MATERIALS** 

Solid Sections: Soft brass up to 11/2 diameter; Half-



The Delta Mfg. Co. also makes the complete line of Delta 149 and 179 single and multi-spindle drill presses.

652 E. Vienna Avenue. Milwaukee, Wisconsin

Hard Brase, up to 1140 diameter; Aluminum, up to 1140 diameter; Aluminum Extruded Sections, up to equivalent of 2 sq. in.; Copper, up to 11/2 diameter, or equivalent of 2 sq. in.; Magnesium (Dow Metal), up to 11/4 diameter; Micarta and Similar rods, up to 11/2 diameter.

Tubular Sections: Soft Brass, Hard Brass, Aluminum Copper, Dow Metal, Micarta and similar tubing, all up to 2ª diameter.

Send for Special Cut-Off Machine Bulletin giving full details and prices on this Delta Cut-Off Machine and accessories.

The Delta Mfg. Co. (Industrial Division) 652 E. Vienna Ave., Milwaukee, Wis.

Please send me special bulletin on the new Delta Cut-Off Machine for non-ferrous metals. Also send latest Delta Catalog of Industrial Power Tools.

Address



## Here's how I boosted their output 50%!

-THE ROTOR ANALYST

They were short of air. This foundry was thinking about adding more air tools to get faster production. Lucky they called me in. Here's what I found: Their two air compressors were overtaxed. Tools weren't turning at top efficiency. An additional compressor to provide the necessary air would have cost \$2,622 and would have required space they didn't have.



This foundry was short of air. Rotor High-Cycle Tools increased piece output 50%.

Analysis. All signs pointed to high-cycle tools. A high-cycle m.g. set would cost about \$937-64% less than a compressor. It could be installed on a wall bracket—out of the way. Maintenance would be less. Cost of high-cycle power would be one-fourth that of air. Delivery of high-cycle equipment could be made quicker.

Result. We installed Rotor High-Cycle Grinders. Boosted their piece output 50% with three less High-Cycle tools than Air tools. The same number of men now get fatter pay. Wheel life has been lengthened because speeds are more constant. Power costs are 75% less. Operation is quiet and clean.

Air or High-Cycle?...I'm unbiased. I'd be glad to make a similar study to improve your portable tool operations. No obligation, of course. THE ROTOR ANALYST

AIR

THE ROTOR TOOL CO

CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS



not enough to assure the defense of this nation. Mr. Knudsen has asked every plant and shop in the country to inventory their machine tools for defense production. All the means at our disposal must be used to meet the urgent demand for high speed production of defense materials.

Berkeley offers you drives to increase output at low first cost. The independent motorizing of the machines in your plant will give you a more efficient set-up. The overhead belt drive can be discarded, doing away with this constant source of loss and trouble. Your machine tools can be placed in the most advantageous places in your production lines.

# All Machine Tools Drafted for DEFENSE

Be ready for the call—Equip your Machine Tools with Modern BERKELEY DRIVES

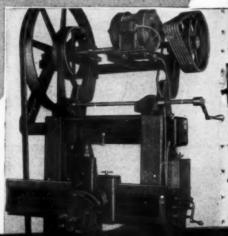
MANUFACTURED BY

BERKELEY EQUIPMENT COMPANY PENNSYLVANIA

We manufacture drives for all puroses: V-Belt, Helical Gear, Variable ipeed (P.O.S.), or Quick Change lear. Welded steel constructed orackets are made to fit your mahines. Installation is simple. Modraize and raise the efficiency of our equipment at a fraction of relacement cost.

hown are two applications of the lerkeley Drive. However, any mahine can be effectively motorized.

Vhat machines have you to be moprized? We will send engineering ecommendations and quotations. To obligation.



# Verson

# DOUBLE-ACTION HYDRAULIC PRESSES

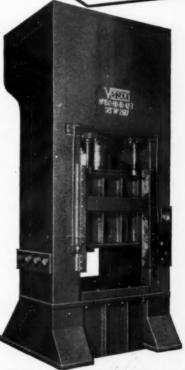
THE pioneers in steel press construction offer you these highly advanced Verson Hydraulic Presses. Custom-built to fit your exact requirements, they will give you the ultimate in press performance. Among their many outstanding features are: Flexibility of control that allows pressure at each corner of the blankholder to be independently adjusted—variation of speed—adjustable main pressure—, adjustable stroke—smooth operation and maximum economy.

Check into the advantages these presses can bring to your plant. Ask to see a Verson Engineer or write for full details.

### Versor PRODUCTS

POWER PRESSES • HYDRAULIC PRESSE
CLUTCHES • FORGING PRESSES
PRESS BRAKES • DIE CUSHIONS





### VERSON ALLSTEEL PRESS COMPANY

9303 South Kenwood Ave. . Sold Through Leading Machinery Dealers . Chicago, III.

# Here's the last word IN BENDING!

for

Arcs

Circles

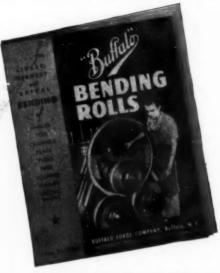
Spirals

AND OTHER

Circular

Forms

Yours FREE Now



Just off the press—up-to-the-minute catalog and handbook on Buffalo Bending Rolls. Send for your free copy now and find out how users of Buffalo Bending Rolls get fast, accurate, low-cost bending on practically any stock.

Ask for Bulletin 352-A.

BUFFALO FORGE COMPANY

161 Mortimer St. Buffalo, N. Y.
Canadian Blover & Force Co., Lid., Kitchener, Ont.

Bull Bending Rolls

# MORE and BETTER tapping with these new Tapping Units



Procunier Universal Tapping Machines give increased output, more accurate tapping—and tremendously increased tap life. The features that make this possible include: 1. Four Speeds, ranging from 390 to 2050 R.P.M., efficiently handle jobs for which conventional high speed tapping machines are inadequate. 2. One machine handles tap sizes from No. 2 to ½ through two interchangeable heads. 3. Extra long Spiral Compensating

Springs conveniently located, with wide range hand-screw adjustments, maintain pre-set tap feeding and reversing pressures INDE-PENDENT OF OPERATOR.

### TAP ESTABLISHES ITS OWN LEAD

The new Procunier Universal Tapping Machine is so designed that it actually allows the tap to establish its own lead. There is nothing more accurate than the tap itself in thread-cutting—so maximum tapping efficiency is attained where the tap is free to establish its own lead in cutting the thread.

This means more accurate tapping with every thread uniform, greater production with less spoiled work and less tap breakage.

### PROMPT DELIVERY

You can get prompt delivery on Procunier Tapping Heads and Tapping Machines.



### New Tapping Head Quickly Pays for Itself

The Tru-Grip Tap Holder is so compact and light (weighs ½ of conventional tap holders) that fly wheel effect is reduced to a minimum. The Tapping Head offers dry, double cone friction clutch that won't wear, can't absorb oil and makes bottom tapping easy—three-point balanced, heat-treated gear reversing mechanism that distributes pull and greatly reduces strain—and many other important features.

### PROCUNIER SAFETY CHUCK CO.

14 S. Clinton St.

Chicago, Illinois

#### SEND FOR BULLETIN

giving full details, description and prices on complete line of Procunier Precision Tapping Heads to meet all needs, the new Tru-Grip Tap Holder— and also the full line of Procunier Universal Tapping Machines, hand, foot or air-operated.

Procunier Safety Chuck Company 14 So. Clinton St., Chicago, Illinois

Send me bulletins on: □ High Speed Tapping Heads □ Tru-Grip Tap Holders □ Universal Tapping Machines.

Name .....

City....State....



# ESCO "STANDARD" DRILL JIGS WILL HELP!

- By Reducing Design Time
  - Reducing Loading and Unloading Time
    - Speeding Up Production
    - Reducing Rejects

### SPEED & ACCURACY

Esco Drill Jigs, large and small, are now helping a great number of manufacturers to speed up production without sacrificing accuracy of finished parts, on machine gun components, airplane parts, electrical parts and a great many others where accuracy and finished work is as essential as rapid production.



THE ESCO MUIT FOR

Write for full information and prices.

### ESCO ENGINEERING CORPORATION

**4855 Fourth Avenue** 

**Detroit. Michigan** 

# THE LEVEL TO BE THE

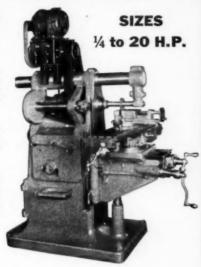
### FOUR-SPEED

### STEP UP PRODUCTION 25% to 300%

Increase your production capacity quickly and easily with this complete line for motorizing all machine tools.

EASY TO INSTALL The Turner Uni-Drive can easily be installed in from one to two hours.

GUARANTEE Turner Uni-Drives are fully guaranteed for one year. They are subject to return for full credit within 60 days if not satisfactory.



### SPECIAL APPLICATIONS

The Turner Uni-Drive can be adapted to many special applications. 3 to 6 speed Selective Sliding Gear Transmission available. Submit your problems on special applications to us for solution and quotations.

### A FAST SELLING LINE FOR WIDE AWAKE DEALERS

#### SOLD THROUGH DEALERS IN MOST CITIES.

In case a dealer is not located in your city, write directly to us for complete details.

Write for Information and Prices.

### by TURNER UNI-DRIVE CO.

(Sales Division Turner Machinery Co.) 1638 Central St.,

Kansas City, Mo., U.S.A.



### GET FASTER PRODUCTION—LOWER COSTS—FROM OLD TOOLS MODERN-IZED WITH GIVEN VARI-SPEED MOTOR DRIVES

Save capital investment—eliminate delays—get the production advantages of the latest types of machine tools IMMEDIATELY-by equipping old tools with Given infinitely variable-speed Motor Drives. ¶ Nothing else like them. Applicable to lathes, drill presses, shapers, turret lathes, radial drills, screw machines, planers, boring mills, grinders, milling machines, etc. Infinitely variable speeds within the ratio 4 to 1. Speeds change while operating. No tool marks. No belt shift. No gear shift. Safe. Positive. Quiet. Shockless. Scientifically engineered—precision built. Fully tested. Patented. Used by outstanding corporations and meeting all requirements of high pressure production. Self liquidating in a short time. Profit makers always. § Types and sizes to satisfy all conditions-1 to 5 H.P. Sold on approval. Send for new Bulletin.

### GIVEN VARI-SPEED DRIVE

**GIVEN MACHINERY COMPANY** 

2016 SANTA FE AVENUE LOS ANGELES, CALIFORNIA







## THE NEW WYCO HY-SPEED SAW

Attaches to Any 1/4" Electric Drill Air Drill or Flexible Shaft

For Production work, sawing all metals that can be sawed with a hack saw—!

Especially designed for cutting Duraluminum, Sheet Brass or Monel Metal, Stainless Steel, etc.

Also recommended for sawing Transite Board, Ebonite and other asbestos products so difficult to cut. Cuts Plastics, Fibre and Bakelite rapidly and accurately to the line.

Price, Complete with extra saw blade and 1/4" round machine file.

\$35.00

Ask for complete WYCO CATALOG

of
WYCO FLEXIBLE SHAFTS,
WYCO SAWS and HOLE

WYZENBEEK & STAFF, INC.

836-838 W. HUBBARD ST.,

Uses Standard

Hack Saw Blades

Canadian Office Representative: A. Ross Oberne

Representative: A. Ross Oberne Capitol Bldg., Toronto

Brooklyn Office 1288 Bedford Ave. Brooklyn, New York



# —But that didn't bother my pop —!

was ready to go home. You see a they have one of those No. 40-H Index High Speed Vertical Mills in the tool room. He milled up the smaller parts for the all important die they were working on. He even did all of the locating and drilling too. The regular milling machines were all busy and the boss had thought they would have to wait at least another day for the parts, so he had ordered the whistle not to blow. When he found out how things had gone, he was very pleased and began to route other work through the Index. It wasn't long before they had two Index Mills, because they found that they could work up these smaller parts so much faster than they had been accustomed; besides this relieved their regular machines for the heavier work.



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# LEDIDN'T BLOW-

Mr. Master Mechanic: .



Write for details and quotation,

All this is figuratively true. We have received many duplicate orders. One Company has five of our machines: another bought their first machine in June and early in December of the same year, they had their fourth machine. You can use an Index Mill to advantage in your plant.

Write today for quotation.

The No. 40-H Index will break that bottleneck in your tool room at 1/3 the cost . . . . .

IT MILLS slots, keyways, cavities, irregular curves with end mills 1/8" to 3/4" diameter in tool steel.

IT DRILLS to accurate locations without layout.

IT BORES up to 3" holes in steel -vertical, horizontal or at angles.

HAS VERNIERS for locating 8"x 16" at one setting.

The fact that we are constantly receiving repeat orders from users is proof of our machine's performance.

See us in Booth No. 159 at the A. S. T. E. Show

3100 E. MICHIGAN AVE., JACKSON, MICHIGAN

## Precision is Assured IN A SOUTH BEND LATHE



NEADSTOCK, Cutaway view showing integral type bearing and the capillary oiling system.





IMPROVED LABBLE and compound rest with adjustable tapered gibs. Cross slide bridge is wide and deep, providing rigid support for the sool rest.



DOUBLE WALL APRON is rigid box type construction with all stool gears running in oil bath.

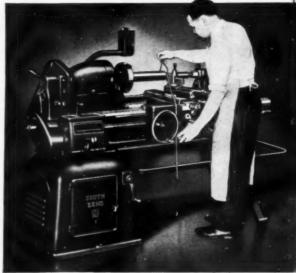


MULTIPLE BISC CLUTCH.
Cutsway view shows alternate



Underneath motor baset.

Bet drive to spindle is smooth
and powerful and provides a
wide range of spindle speeds.



PRECISION IS ASSURED in South Bend Lathes by combining fine workmanship with sound machine design. Expert mechanics fit each unit with an exactness known only to the machine tool builder.

South Bend Lathes are used in tool rooms of nationally known manufacturers for the most exacting classes of precision work. They are also used for production operations on interchangeable parts requiring a high degree of accuracy. Conveniently located controls assure an ease of operation which results in a uniformly efficient rate of production over a long period of time.

South Bend Lathes are manufactured in over 65 sizes and types. Popular sizes are available for delivery from dealer display stocks in important cities. Made in 9", 10", 13", 14½", and 16" swing, in 3' to 12' bed lengths, in Countershaft and Motor Drives.

#### ON DISPLAY IN ALL PRINCIPAL CITIES

Bukimore, Md.—Carey Machinery & Supply Co.
Boston, Mass.—The MacKensie Machinery Co.
Boston, Mass.—The MacKensie Machinery Co.
Beridge 9 or 11, Co. Bing 200 de Bridge 9 or 11, Co. Bing 200 de Bridge 9 or 11, Co. Bing 200 de Bridge 9 or 11, Co. Br

Newark, N. J.— J. B. Edwards Machinery Co. New York, N. Y.— A. C. Colby Machinery Co. Philadelphia, Pa.— W. B. Rapp, Machinery Philadelphia, Pa.— W. B. Rapp, Machinery Providence, R. L.— Gen. T. Reynolds & Son Rochester, New York — Ogden R. Adams Sc. Paul, Minn.— Robisson, Gar & Sandi Co. San Francisco, C. L.— Moore Machinery Co. York, Pa.— Food Machinery & Supply Company

### SOUTH BEND LATHE WORKS



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# The Editor's Page



SYMBOLIZING the lofty ideals of American Tool Engineers, this timely Koebel Diamond poster should help to foster patriotic support and cooperation throughout the Defense Industries. Keynoting National Defense, the Detroit Exhibition will present many important contributions of our Tool Engineers—new and better tools and methods for speedy production of adequate safeguards for our country. If you are interested in any branch of Defense preparations, can you afford to miss the Detroit Show?

Wesley G. Paulson

**MARCH 1941** 

### FEATURES THAT HELP YOU KEEP PRODUCTION UP

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Hannifin Arbor Presses are built in 57 standard types, capacities 600 to 50,000 lbs. for assembling, straightening, forming, and similar work involving the application of pressure. Also furnished with the Hannifin patented oil cylinder speed control.

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Write for Bulletin 46-H giving complete data on all types

HANNIFIN PNEUMATIC ARBOR PRESSES

# Featured In This Issue

AUTOMATIC SHELL MACHINES— The Machine Tool Industry offers these tested designs of automatic shell machines, which can be built speedily in any well equipped manufacturing shop. This broadens the source of supply and enables the tool industry to concentrate on aircraft engines, tanks, guns and other essential defense details.

INFRA-RED DRYING — While the use of incandescent lamps for drying and heating is comparatively new, it has proven superior in many instances to conventional methods. Dean M. Warren of the G-E Nela Park Engineering staff gives performance facts and figures.

HANDY PORTABLE GRINDERS — These versatile grinders are doing tough jobs every day and returning a neat profit. Carleton Cleveland illustrates and describes some of these applications in a way that should suggest additional uses for portable grinders.

BROACHING HOWITZER BORES— Time is a critical factor in our defense preparations. This contribution by E. J. LaPointe tells of a new and faster method of completely broaching howitzer barrels with an American hydraulic broaching machine.

MODERN HANDLING EQUIPMENT
—Starting with a layout and description of a typical modern plant arranged for practically straight progress from one end to the other, many individual items of handling equipment are presented. These include such novelties as packaged crane assemblies, new models of lift trucks, hoists, crane, positioners, etc.

ARC WELDED FIXTURES — A. S. Curry discusses the pros and cons of arc welded steel and cast iron milling

jigs and fixtures with facts and figures. The article is based on an award study submitted to the James F. Lincoln Arc Welding Foundation by Mr. Curry, who is Methods Engineer of the Nash Engineering Co., South Norwalk, Conn.

PIERCING AND BURNISHING — A new method of Piercing and Burnishing in a single operation is described by J. A. Smith, President, Durable Punch & Die Co. Combining these two functions eliminates the expense of subsequent shaving or finishing the holes.

AUTOMATIC CAM MILLING — A new method of milling cams for automatic screw machines through duplicator control is described. It offers greater accuracy and substantial savings in hand finishing time.

THE SCRAP PROBLEM — Scrap metal disposal is a serious problem in many shops. Frank V. Faulhaber offers many constructive suggestions for handling scrap with maximum economy and savings.

DIRECTING THE SHOW—Presenting the officials at the helm of the A. S. T. E., who will direct the National Machine and Tool Progress Exhibition and Convention of Tool Engineers.

TECHNICAL SESSION PROGRAM— Many interesting talks and discussions are scheduled in connection with the Show—all bearing on the subject of National Defense.

PREVIEWING THE SHOW — Highlights of many of the new tools and machines that will be unveiled at the Exhibition in Detroit.

WHAT'S NEW IN THE INDUSTRY— Presenting the latest developments in machine, tools and methods.

# How to get Steel More Quickly

### A practical suggestion that may help you

Speed your steel by sending open orders (not inquiries) to a dependable source of supply. We are glad to receive all inquiries and give them prompt personal attention but with today's emergency demands there is a chance that certain stocks may become depleted while the request for quotation is being handled.

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# **Automatic Shell Machines**

Machine Tool Industry Expedites the Making of Machines to Produce Shells

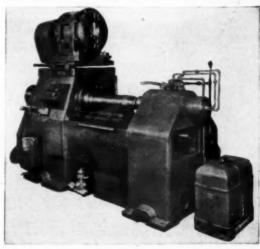
THE machine tool industry, working through the Defense Committee of the National Machine Tool Builders' Ass'n, some months ago designed a line of special machines for making of shells. The purpose of the project, undertaken at the suggestion of Army Ordnance officers, was to put into the hands of the War Department, complete and tested designs for shell machines that could be built quickly in any well-equipped manufacturing shop whenever the need for them arose.

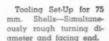
By making it possible for plants not otherwise engaged in the defense program, such as those manufacturing printing presses and textile machinery, to build shell machines, the machine tool industry has broadened the source of supply and at the same time has freed itself to a greater extent to concentrate on the production of equipment for aircraft engines, tanks, guns and other items that require precision machine tools. Though shell manufacture is important, it is not a precision job. The closest limit on a shell is five thousandths of an inch and most limits are from 20 to 30 thousandths.

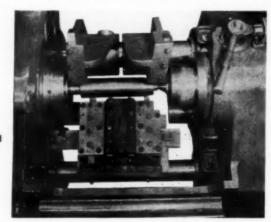
With the defense program shifting into high gear, this line of shell machines is now in production.

The design comprises a complete line of machines for turning, boring and facing medium-caliber shells. The machines are of two sizes—one for the 3" group of shells, the other for the

New Design of Automatic Machine for the Speedy Production of 6" Shells.







6" group. In each group, there is a basic machine that is standard for all of the operations in that group. Each unit is then equipped with whatever slides, tailstock, tooling equipment and motor drive are required for a certain operation. The machines are capable of all operations except cross drilling, notching, and such operations as nosing-in, squeezing the band into the band seat, and welding the bare end-plate.

The engineering work was done under the direct supervision of Myron S. Curtis, Consulting Engineer in machine design.

There are three outstanding features about the new machines:—(1) they are of simple construction so they can be built quickly in substantial quantities; (2) they are inexpensive and can produce shells economically, and (3) they are automatic so they can be handled by unskilled operators.

To make the building of the machines as simple as possible, the design completely eliminates all large planing and boring operations and all machining operations, large and small, on the main casting, except for the drilling of a few small holes. This is accomplished by supporting the carriage for the turning tools, as well as the swinging arms for facing operations, entirely on longitudinal bars instead of planed way sur-

faces. Moreover, these bars (there are three of them) together with the spindle, tailstock sleeve and all shafts, are carried by bushings which are cast in place in the main base of the machine.

The casting-in-place of bushings is accomplished by use of a pouring fixture for locating and supporting the bushings on pilot bars, and the use of a low melting point lock-in metal. The base of the machine has pouring holes cast in it, and in some cases two bushings are poured through the same hole. The recommended pouring metal is a lead-tin, high-bismuth alloy which expands slightly upon cooling.

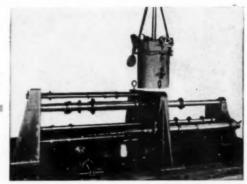
In addition to the bushings supporting all shafts, the seat upon which the cover plate rests is also made of this alloy. The metal is poured in a trough on top of the headstock of the machine and allowed to find its own level. The cover plate, which also serves as a support for the motor, is then fastened to the base casting upon this seat. All doors and plates are attached to the rough base casting by cap-screws. Neoprene gaskets are used with doors and plates to insure oil-tight joints, as the door seats are not machined.

The machines are all single-speed units except in cases where 2-speed motors are used. The motors vary from

BORING COUNTERBORES ACHINES Precision HYDRAULIC POWER UNITS TOOLS IF IT'S recision Precision THREAD YOU NEED/ RINDER Precision CARBIDE TOOL ... EVERY EX-CELL-O PRODUCT RINDERS REPRESENTS THE HIGHEST Precision PERFORMANCE IN THE MACHINE TOOL INDUSTRY ROM the day of its organization, Ex-Cell-O has maintained only one standard in the designing and the making of any machine, tool, or part bearing the Ex-Cell-O name—the greatest degree of accuracy that progressive engineering, skilled craftsmanship, and modern factory methods and facilities can produce . . . this is why it will definitely pay you-if you have any need or problem in the metal-working fields indicated by the precision machines and tools shown here—to get in touch with Ex-Cell-O. Precision EX-CELL-O CORPORATION - DETROIT, MICH DRILL JIG BUSHINGS Precision INTERNAL LAPPING MACHINES Precision CENTER LAPPING Precision MACHINES Precision BROACHES GRINDING SPINDLES EX-CELL-O CORPORATION 1188 Oakman Blvd., Datrait, Mich. EX-CELL-O MACHINES Precision AND TOOLS Send folders on following Ex-Cell-O Pre-

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Arrangement of Pouring Fixture for Locking Bushings in Red.



10 to 60 h.p., depending upon the operation to be performed.

The main drive of the machine is from the motor, mounted on top of the headstock, through V-belts to a drive shaft, then through a jack shaft to the spindle. The drive to the feed mechanism is through a chain and sprockets to a set of pick-off gears, then through a shaft to a feed worm and gear. This gear drives a drum cam for reciprocating a sliding bar on which the turning carriage is located, as well as face cams for operating the facing arm and the bar for supporting and oscillating the turning carriage.

A constant-speed, individual motor is belted to the feed box for rapid traverse of the tool carriage. Certain of the tool blocks are slideable in the tool carriage. These are controlled by a stationary cam bar. The spindle and all of the shafts run in plain bearings. There is a ball thrust bearing on the

spindle as well as on the feed drum shaft. These bearings are bronze, with a lining of Babbitt metal about 30thousandths thick.

The machine has a live tailstock center which is moved longitudinally by hydraulic pressure. The valve for controlling this hydraulic movement is operated by the binder lever. But one movement of the lever is therefore necessary to move the center into position and to clamp it. Likewise, the reverse movement of this lever both unclamps the tailstock and removes it from the work.

There are two principal methods of holding the shells:—(1) gripping on the inside of the open ends by means of an expanding arbor, while using the tailstock center for supporting the base ends of the shells; and (2) gripping on the outside diameters by means of a collet chuck. In either case, the shell-holding mechanism is hydraulically actuated, and control is by means of foot levers, in order to leave the operator's hands free.

It is intended that one central hydraulic system, with accumulator and tank, will serve a complete line of the machines, to avoid the greater expense of a self-contained hydraulic system for each machine.

Lubrication of the machine is by gravity from a trough cast in the top of the base, from which oil pipes lead

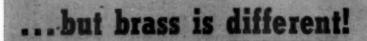
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NICHOLSON Files & S.S.

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Left: Angle of regular double-cut Flat or Hand file.

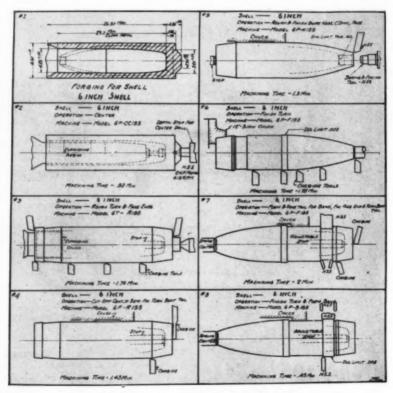
> Right: Angle of special-cut Nicholson Brass File.



to the various bearing surfaces. The oil settles in a sump in the base of the headstock, from which it is pumped by a separate motor - driven unit through a strainer and pressure valve back to the oil trough. The pressure switch consists of an electrical unit so connected with the control system that none of the operating motors, with the exception of the lubricating pump motor, can be started or operated unless there is sufficient pressure on

the lubricating system.

It is intended that coolant be supplied a line of machines by gravity from a central tank, the coolant from the machines being pumped back to the tank from a collecting sump. The central system serves two purposes:—reducing costs and keeping the coolant at a much lower temperature than would be possible otherwise without requiring tremendous quantities of coolant.



Typical Operation Sequence Sheet for 6" Shells.



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# Infra-Red Drving

### By DEAN M. WARREN

PEED is the watchword of the day. With industry bending every effort to produce the things which America needs for defense, every human production aid is being utilized.

While the idea of using incandescent lamps for drying and heating is com-paratively new, it has been proven practical and in many instances far superior to conventional methods of drying. The advantages of this method of drying are:

- 1. Greater speed.
- 2. Lower cost of equipment.
- 3. Cleaner and more comfortable working conditions.
- 4. Adaptability to changing paint schedules.
- 5. Greater flexibility of equipment.
- 6. Elimination of warm-up period.
- 7. Lower operating cost in a great many applications.

The Ford Motor Company was the first large scale user of infra-red drying and they are drying the prime coat on their cars in a lamp tunnel in 7 minutes as compared with 45 minutes in an oven at 250° Fahrenheit; the second coat formerly required an hour and

The Steel Storage File Cabinet Company, Cleveland, formerly used an air dry paint and stacked their cabinets from 2 to 4 hours before packing. Today they are drying a medium bake synthetic enamel in 5 minutes with the 250-watt drying lamps.

The National Cash Register Company now bake a high bake synthetic enamel in 6½ minutes under drying lamps where formerly they required an hour and a half in an oven at 350° Fahrenheit.

The Dickey-Grabler Company of Cleveland, which specializes in metal stampings, have been able to cut a 45 minute drying operation to 3 minutes using drying lamps, at the same time, using 40% less space than the previous method.

The drying of paint and similar finishes is generally a thermal process and the temperature attained is of primary importance. On the other hand, the

a quarter in an oven at 250° and is now done in 14 minutes.





evaporation of water and other liquids depends on the amount of heat or BTU's that are added to each pound of the liquid. Certain jobs of mass heating which require a very definite temperature can be figured on the basis of the BTU's that are required to heat the metal up to that temperature. In considering the application of infra-red drying lamps, it is necessary, therefore, to estimate the temperature that will be attained and the BTU's that will be required for a given job.

The temperature attained under the drying lamp on a piece of sheet metal, for instance, is influenced by several factors which can be briefly outlined as follows:

- 1. Rate at which radiant energy is arriving at work
- Per cent of this energy that is absorbed
- 3. Heat capacity of the work

and the R-40.

4. Rate of heat loss from the work

Here are two members of the drying lamp family—the 250-watt PS-52 Forest City Foundries has cut drying time on furnace panels from 30 to eight minutes with drying lamps. There are 128—250-watt lamps in 10" gold plated reflectors. Polished aluminum sheets over entire working faces of oven reflect the radiant energy ordinarily lost.

The higher the concentration of radiant energy arriving at the work, the higher the temperature will be after a given interval. Likewise, the more of this energy that is absorbed, the higher the temperature will be. As to the factor of heat capacity of the work, paint finishes on materials with low heat capacity and low heat conductivity, such as wood, will attain a much higher temperature in a given time than will the same finish on a metal. Thin metal has a lower heat capacity than thick metal and will attain a higher temperature. In considering heat losses from the work, convection currents and drafts are the most important to con-Enough convection currents should be allowed to circulate to keep the concentration of volatile solvents, etc., to a low value. On the other hand, too much draft will cool the work unnecessarily and make the oven less efficient.

For preliminary calculation on the number of BTU's that are required to do a given job of, say, water evaporation, it is necessary first to find the pounds of water that must be evapo-



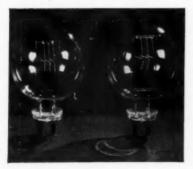
At the Steel Storage File Co., a medium bake synthetic enamel is dryed in five minutes. The older method was to use an air dry paint and the time required with this was from two to four hours. Aside from economy of operation, many plants have found that the cure is more uniform.

rated per hour. The BTU's that must be added to each pound of water to vaporize it will be 970 (heat of vaporization) plus 212 minus the temperature (°F) at which the work goes into the oven. When this figure is multiplied by the pounds of water per hour, the BTU's per hour at the work are This should be divided by obtained. the efficiency of the reflectors used and also by the absorption factor of the surface receiving the radiant energy. Dividing this final BTU value by 3413 then gives the kilowatts necessary to do that particular job. The lamps and reflectors can be arranged in any manner that is convenient so long as the efficiency (used in the calculation) is not decreased by so doing. In calculating for materials other than water, the specific heat and heat of vaporization for that material should of course be used instead of the above figures for water.

c, w - h

n

These preliminary computations are far from conclusive, since there are many variables that are difficult to measure and there is such a great range of materials being treated that it is





really impossible to have any set formula for obtaining an answer in every case. It is therefore advisable to follow them with actual experimental work on the material in question. Such test work is preferably conducted in the plant where conditions can be controlled and results tested.

In experimental tests, however, it must be remembered that the concentration of radiant energy from just a few drying lamps and reflectors is generally much less than that obtained under an extensive bank of them. For example, with one type of reflector that is widely used today, only half the energy at any given point comes from the units directly above that point. The other half of the energy comes from the units around it. Tests, therefore, should be conducted either in a tunnel large enough to surround the article being tested, or, a small section of the article, say, 2" square, should be tested under a bank of seven units so mounted that six of these units form

These two larger units are the 500 and the 1000-watt G-40 bulbs respectively.

### ALL-IN-ONE

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WRITE FOR BULLETIN 409

T. C. M. MFG. CO. HARRISON, N. J. a hexagon and the seventh unit is in the center. It is, of course, quite practicable to test with only one drying lamp and reflector if a thermopile is used to measure the concentration of radiant energy under the unit and this concentration is adjusted to a known level that will be used in the final installation.

Drying lamps are very flexible in their application. They can be mounted in a great many ways depending upon the needs. There are, however, several general designs of drying lamp ovens now in successful use.

One design that is gaining rapid favor is the cylindrical tunnel. The cylindrical shape allows the energy from more reflectors to be directed on the work, thus giving a higher density of radiant energy.

Drying lamp tunnels are being used for drying finishes on automobile bodies, wheels, and other parts, and also for drying touch-up enamel on refrigerators. They are being used to dry sheet metal parts after bonderizing.

Flat banks of drying units can be mounted with advantage over flatwork such as paper, textiles, wood and steel panels, etc. Small flat parts can best be baked with radiant energy by such flat banks of units. Sometimes such a bank of units can be placed on both sides of the work, thus cutting the time and space required.

A third method of applying drying lamps emphasizes their flexibility. This is the use of a small portable unit that can be moved to the work rather than an oven that would require that the work be moved to it. This is a particular advantage where the work is large and clumsy or where only a part has to be heated, as for example, touchup work on automobile bodies. automobile factories and also in garages, hundreds of small banks of drying lamps are making it possible to dry work which would have been prohibitive in cost if conventional type ovens had been required.

Industrial experience has shown a breadth of application beyond the limits of any one size of drying lamp. For this reason several sizes and types of



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The THOU-METER"

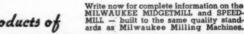
exclusive with the Milwaukee Midgetmill. Set cutting tools by direct reading merely touch tool to work, set dial at zero, and mill, drill and bore until dial shows correct reading — in thousandths. No graduations—dials—stops—binding screws. Accurate to plus or binding screws. Accurate to plus or minus .00025 in. in its 2½ in. of travel.



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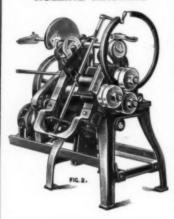
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East St. Louis, Illinois

lamps capable of solving practically any field problem within the scope of present techniques have been developed.

The 250-watt PS-30 is designed for practically any commercial drying lamp reflector. Operating equally well in any position, this lamp is ideal for average installations of tunnel or gang set-up methods. This lamp in 12" goldplated reflectors with the edges touching will supply 1.2 watts per square inch of radiant energy on the work. This can be increased to 1.8 watts per square inch using the 9" reflector and 2 watts per square inch with the 8" reflector.

If there are space limitations on the number of drying lamps that can be used, the 500- or 1000-watt G-40 Bipost base lamps are the logical answer. These sources have the same mechanical dimensions and are therefore interchangeable. The 500-watt lamp in a 12" gold-plated reflector, edges touching, 12" from the work will provide up to 3 watts per square inch of radiant energy and the 1000-watt in the same equipment and mounted the same distance from the work up to 5 watts per square inch.

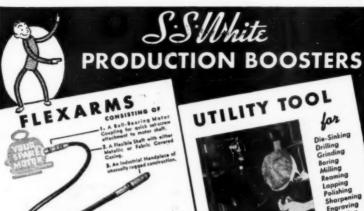
The 250-watt R-40 lamp, modeled after the reflector lamps, can be used for many specialty jobs. This source employs the same rugged filament as the PS-30 lamp and operates at the same color temperature. It is a fixed focus device permitting high concentration of radiant energy of from 2 to 6 watts per square inch, depending upon spacing and mounting height.

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# THERE IS NO SUBSTITUTE FOR THE HACK MULTI-VERSAL

- PROGRESS—For the past five years, the HACK MULTI-VERSAL has steadily progressed toward its goal as a super-efficient universal machine tool.
- POPULARITY—In its history making achievement, the MULTI-VERSAL has gained a popularity of such proportions as to eliminate any misconceptions regarding its investment value as a necessary modern machine tool.
- CONVERSION vs. SET-UP-TIME LOSSES—Because of its new economic principle of rapid conversion, it challenges as inefficient much of the old familiar practice of transferring from bench to machine, and from machine to machine with the usual set-up-time losses.
- SIMPLICITY—No prior acquaintance with the MULTI-VERSAL is necessary. Its operation is simply a matter of common sense.
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- FOCUSED CONTROL—After taking the normal working position before the machine, the workman need not move one step to put the machine proper through its paces, because the focused control feature gives him instantaneous selection of speed and feed controls.
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### WHAT USERS SAY:-

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"Handiest machine we have in the shop" says another. Canadian Defense Education—
"An ideal machine to rapidly train apprentices in the principles of machine and tool shop practices"

"Ship three machines as quickly as possible" says a third user.

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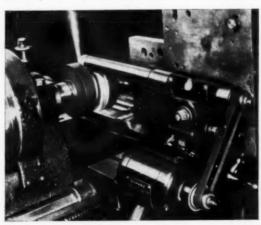
# Handy Portable Grinders

### By CARLETON CLEVELAND

FOR progressive industrial activity, modern machining processes require up-to-date equipment. Precision grinding is one of the developments that has come to the front, and with the versatility of the portable precision grinder, or lathe grinder as it is sometimes called, ever widening uses are found as a convenient and economical auxiliary for almost every type of machine tool.

The lathe grinder facilitates complete and precise machining of work on a lathe, boring mill, shaper, planer, or other machine tool, and is particularly adaptable for precision tool-room work and small-lot manufacturing jobs. For instance, an old, established firm of jobbing toolmakers and mechanics in Racine was called upon to prepare some steel plates to be used in the molding of rubber tile baseboards. A perfectly smooth surface was imperative, since the slightest imperfections would show in wavy lines on the finished product.

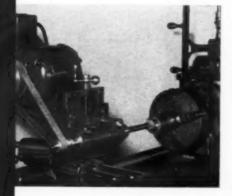
To accomplish this without resort to the drudgery of hand polishing, a portable ½-h.p., toolroom lathe grinder was mounted on a standard planer. No special rigging was required for this attachment; the stone used being a 4" x ½" x ¾"—40-J-31S mounted on an external quill, the grinder operating at a speed of approximately 6500 s.f.p.m., with a capacity of 1/16" for every stroke of travel, .002" of stock being removed

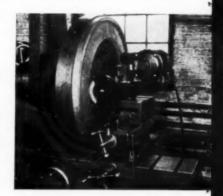


Mounted on a lathe, using a right-angle plate, a Portable Lathe Grinder is shown finish-grinding Pump Tubing Rollers. A one-h.p. Portable Grinder mounted on a large engine lathe, grinding a huge ring of chilled cast iron.

in the course of each completed stroke.

Grinders are particularly interesting to American industrialists, since they are an exclusive American development, being first used for grinding and finishing spindles for textile machinery as early as 1855. The users of these crude machines at that time were obliged to depend on emery wheels and other natural abrasives without regard to uniformity of quality, as it was not until late in the 1870's that the manufacture and bonding of synthetic abrasives was perfected to the point where grinding became a recognized production metal - cutting process. Grinding is frequently considered by the layman, as an abrasive process in which the metal is rubbed or pushed off. In reality, it is purely a cutting process, since photomicrographs of material removed by a grinding wheel, show that the particles resemble miniature chips removed by a lathe tool. A grinding wheel might well be likened to a disc on which are mounted thousands of small cutters and these, when operated properly and under the right





conditions, remove metal in a shearing,

chip-like form.

Portable precision grinders are entirely self-contained, being driven by independent motors, and may be mounted in vertical, angular or horizontal position. A large assortment of readily interchangeable quills of various lengths, for internal and external grinding is available, providing for a wide range of performance in difficult and intricate tasks frequently encountered in machine shop practice. Recently a deep cylinder was finished to .0001" accuracy by using a grinding wheel mounted on the end of a spindle extending 16" beyond the grinder and operating at extremely high speed. Internal grinding has been successfully accomplished to a depth of 18".

Spindle speeds as high as 42,500 r.p.m., may be obtained with some of grinders, adapting them to the internal grinding of holes having diameters as small as ½". There is no limit to the dimensions of work that can be ground cylindrically. One shop was recently called upon to recondition the cylindrical surface of a hydraulic hoist piston, 12"

Portable Grinder mounted on a lathe with spindle unit in place for Internal Grinding.



in diameter and some 10 feet long. The piston had originally been finished on a large roll grinder, but since the shop called upon to do the reconditioning had no machine of that type available, a portable precision grinder equipped with an 8" grinding wheel, and mounted on a heavy-duty lathe, was used. The job was thus accomplished satisfactorily and at low cost.

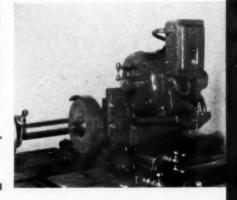
A manufacturer of dredging machinery and steam shovels has found use for the portable precision grinder in work of a semi-special nature, principally in internal grinding operations. One of the jobs on which it is used at this plant is on manganese steel castings, the range of the internal work being from 1 ½" diameter for the smallest holes, with a depth of 3" up to the largest holes of 6" diameter and of 12" depth.

The large rubber rolls used in paper mills, mercerizing plants, cotton dyeing and finishing mills; and also the inking rollers on large printing presses, must be ground or refinished from time to time, because of a tendency to swell, and must be given a smooth, uniform, Portable Precision Grinder mounted on a lathe and using an 8" extension quill to finish-grind a Drill Jig.

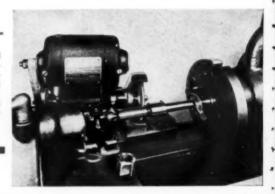
cylindrical surface. Some of the larger plants maintain departments for handling this refinishing work. Others may send the rolls out to nearby machine shops equipped to handle such work. These rubber rolls vary in softness. Some of them can be finished with one grinding cut, while others may require two or three, the depth of the finishing cut varying from 0.0015" to 0.003".

A manufacturer of pump tubing recently hit upon a unique method of grinding the desired contour on forming rollers at a fraction of the former cost by mounting a portable grinder in a vertical position on a lathe carriage. In this instance, plates were mounted on the carriage and the grinder unit was then attached to the plates with the spindle above. A 12" quill, carried on its end, a 21/2" grinding wheel. In spite of the extension, and opearting at a speed of 8,600 r.p.m., grooves were finished in the rollers, previously rough machined and hardened, and they were accurate to within 0.0001". The late cross-slide was fed in and out approximately 2" in successive passes across the work.

External grinding operations with a portable grinder mounted on a lathe.



Because the threads had been distorted in the process of hardening, this close-fitting Boring Cutter would not screw onto the tool. With the aid of a Thread Grinder Attachment, new threads were ground at a considerable saying.



The ingenious arrangements to which these grinders lend themselves are legion. In one case, a grinding unit was attached to an angle plate, which in turn was mounted on the tool-head of a shaper ram. This set-up was used for grinding a layout plate approximately 30" by 18", level from corner to corner within 0.0003". The table was fed sidewise approximately the width of the grinding wheel, upon the completion of each forward and return stroke of the shaper ram.

Recent development has brought forth a new attachment which, with proper adjustment, converts the portable lathe grinder into a precision tool for grinding threads. This attachment comprises a specially designed mounting post, ingenious wheel dresser, and a thread grinding wheel. Accurate helical angles are obtained by two simple adjustments; the wheel is dressed correctly with a stroke-action lever; and in a matter of minutes, precision ground threads may be turned out on a lathe at a fraction of former costs.

Another innovation is a wheel shank support for use in deep internal grinding of small diameters. These small diameter holes, which were formerly "eased" out—or just not ground at all—can now be precision ground with the aid of a mounted wheel shank support, affording more rigidity and greater

accuracy. This shank support, 2 11/16" long and 2204" in diameter at the larger end, slips over 3" mounted wheel chanks, a 3%" per foot taper strengthening the mounted wheel and minimizing the possibility of "whip."

The die - maker finds the portable \* grinders particularly adapted to the job of die-making because of extreme flexibility and the inherent precision qual-They quickly lend themselves to many unusual grinding set-ups so often required for finishing dies. one instance, 57 separate and distinct ' grinding operations were performed with portable precision grinding units in making an exacting motor-lamination die. Some of the grinding operations, on the individual parts of this die set were performed with the precision grinder mounted on a lathe, while in other operations the grinding unit was mounted on the outer arbor support of ' a milling machine, which is especially advantageous when contours must be, ground.

Photos-Courtesy The Dumore Co., and the Standard Electrical Tool Co.

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Illustrated is the type of collet manufactured by the Modern Collet and Machine Company to hold oil pipe as it is being heat-treated. The collet diameter is sixteen inches.

Fit's a collet, Modern Collet can produce it. Probably no other collet being manufactured today is as large as that shown in the above photograph. From sizes such as this down to those which are extremely small, there is no type of collet which this company cannot furnish in any desired quantity. In standard types for screw machines, lathes or milling machines, thousands are carried in stock.

Exclusive features of design and construction are found in every Modern Collet. They're features that assure you of the best in collet performance. Write for full details.

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# DEFENSE PRODUCTION

No. 55-Table speeds up to 125 ft. per min.

Working surface-12'x36'.

These Grand Rapids Grinders, and others, will enable you to meet the demands of the present Defense Program.

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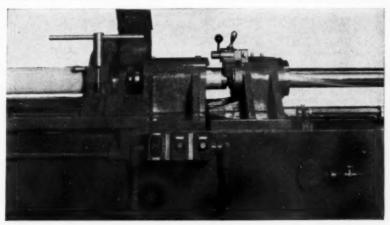
# **Broaching Howitzer Bores**

By E. J. LAPOINTE

In VIEW of the current emphasis on haste in defense preparations, a new and faster method of accurate production rifling of 105 mm., Howitzer bores is interesting. All of the 36 spiral grooves, .030° deep, are broached simultaneously. A series of 24 cutters is run through the barrel in sequence, each cutter removing a slight amount more metal from each groove than the preceding cutter. Approximate time for complete broaching of a Howitzer barrel is 1½ hours, which represents a higher production rate than can be obtained by other methods. So far as is known, the machine is a pioneer effort in hydraulic rifling.

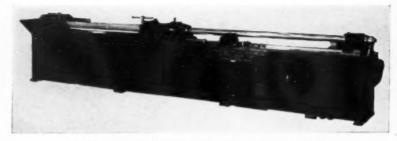
The machine is designed and built for broaching rifling grooves of constant helix in gun barrels. At the present time, the machine is not adaptable for the rifling of an accelerated helix.

The method employed in producing the rifling grooves is to push a high speed steel, hardened and ground cutter through the gun, driving the cutter in the proper helix angle so as to broach all the grooves together. Each cutter has an increased diameter over the previous cutter so as to take a chip of approximately .001" to .002". Cutters are mounted on the end of a



Closeup of cutter adapter arrangement. Guard has been removed from lead bar and hinged guard raised to show position of cutter ready for entering the gun barrel.

NAMED DIES AND TAPS cut



Front view of entire machine showing the guard dismantled from the master spiral gun barrel.

long quill which guides in the bore of the gun barrel.

The machine is of standard construction, consisting of fabricated steel bed containing the hydraulic cylinder, oil reservoir, valving, piping, motor and motor controls, as well as the entire coolant system. The machine slide is of normalized and seasoned nickel iron. The cylinder is of steel tubing, properly supported in the machine slide, bored and honed to a mirror finish. The ways of the slide are accurately scraped to a full bearing and guided in the hardened and ground bed ways, which are automatically lubricated at each stroke of the machine.

The master lead bar is hollow to permit a generous supply of coolant at the cutting tool. This lead bar is driven laterally through a roller thrust bearing by the cylinder slide unit, and spiraled by a driving plate, adjustable for index. The driving plate unit is also provided with a back lash takeup adjustment. The driving plate unit is mounted in a casting, integral with the quill support and front support for the part. This design provides an absolute and positive alignment for these three important details.

The quill, carrying the cutters is mounted by means of a taper shank in the end of the master lead bar. Front end of quill is provided with a "U" washer to facilitate changing the cutter details. This entire drive mechanism is covered by a substantial shield,

which is provided with latched doors, to provide maximum accessibility to the entire mechanism.

Coolant supply from the coolant reservoir at left hand end of machine is directed to the cutter edge at all times by means of a telescoping feed tube



Top view looking toward spiral bar end with guard removed. Complete guarding prevents splashing of coolant or oil.

# NAMCO DIES AND TAPS cut LEAD SCREW thread



Non-revolving type self opening Die with cirblar chasers. Capaciies 1/4 to 41/4".

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### Here are the facts-YOU be the jud

More "RIDGID" pipe die heads are sold than any other n threaded with Namco Dies and Taps. That speaks for their performa The time for tapping the malleable casting, 31/4" diameter I 11/4" long, is 45 seconds - with a Namco precision circ chaser Collapsing Tap.

The time for threading the male pieces, with a Namco circular chaser Self Ope Die, is 61 seconds. Formerly the thread on this piece was milled-in 4 minut

As to accuracy, Mr. Wm. Thewes, superintendent of Ridge Tool Co. says: "t threads are held to .0005" for the 11/4" length of their engagement—lead screw curgey." And he adds, "scrap is practically nil-we couldn't afford it."

This is just one more proof of performance for savings with Namco Dies and T What might they mean on YOUR work?



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AD GRITTITY 6-7 AND 8 DYRIGH HAR AND CHOCKING EXTOMATICS - LINGUI SYMBLE SYTOMATICS - RETOMATIC THRESCHING B TAPL - SCHIPM BACKING PRODUCTS - THE CHORMOLOG - LIMIT DWITCHES - POSITYS CENTRIAGE - CONTACT MANUFACTURE

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Use the BARKER
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Don't let wrenching and adjusting waste your production time-keep your lathes working and not waiting. With the BARKER Wrenchless Chuck the usual chucking time is put into actual production.

It can be adapted to any type of work that may be done on turrets, engine lathes, semi-automatic or pipe threading and cutting-off machines. Users everywhere are getting high percentage increases in production. You can get similar results as soon as you put the BARKER to work.

The BARKER Wrenchless Chuek is simple and sturdy in construction. It is compact—requires no accessories to install. It permits har work to spindle capacity. A quick movement of the lever releases or grips the work. Well adapted for a diversified line, from small brass castings to heavy forgings. Write TODAY for full details.

Made in two and three jaw tupes

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arrangement which eliminates entirely the use of flexible tubing. A sloping trough sealed to the column sides, conveys the coolant to the coolant sump at left hand side of machine, effectively sealing the machine guide ways against coolant wash or foreign matter.

Machine is driven by means of a Sundstrand variable delivery pump, direct from the driving motor. Relief valve, adjustable and conveniently accessible, protects against overload.

The part is located at the muzzle end by means of a manually operated clamp and support block, integral as heretofore described, with the quill guide and spiral bar drive unit. The part is also located at the breech end by a similar manually operated lock station, mounted on the machine bed. End thrust during the cutting operation, is taken by the tailstock mounted on left hand end of machine bed. The work is clamped between split bushings, which are soft, to protect the external surface of the part. Cutting action is directed from muzzle to breech end of the part.

Machine Specifications:—Capacity, 12 tons; cutting speed, 15 F. P. M.; return speed, 30 F. P. M.; maximum stroke, 100"; work height, 40"; overall height, 4 ft.; floor space, 2½ by 22 ft.; net weight, 24,000 pounds; motor required: 15 h.p.—1200 r.p.m. with across-the-line starter and separate push button station.



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### BABY GUSHER Machine Tool Coolant Pumps?

Made in four types; 1/30 and 1/10 h.p. for small machine tools and machines requiring from 4 to 10 G. P. M.

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\* \* \* When any man adds a single hour to the production life of a tool, or makes that tool do better work, that man makes a worthwhile contribution to American ideals and to America's future.

Every man—whether he admits it or not—takes pride in doing his work well. Within him is the desire to give to the fullest extent of his ability and training.

Because this trait is universal, a dual responsibility is placed on Management: (1) to furnish men with suitable tools, and (2) to teach them the proper use of these tools.

Responsibility for the training of men in the use of tools must begin with those who make the tools.

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Write for booklet "For (Grinder) Men Only". It will help prolong the life of your diamond tools.

# Modern Handling Equipment

### By GEORGE A. FAIRMAN

### Speeding Tool Production

BRYANT Chucking Grinder Co., recently completed a plant addition in which the flow of production has been coordinated with existing machinery. With the help of carefully applied materials handling equipment, this provides for practically straight progress from one end of the plant to the other.

The scheme of the layout is shown in the diagram. Raw materials, including all castings, are delivered at the open end of the new building. Trucks back in here and when the materials to be unloaded are heavy, they are removed from the truck by means of the 5 ton Shepherd-Niles traveling crane or by a one ton crane with manual hoist, both operating in the bay next to the filler room. There is a narrow gauge track in this unloading space for a hand push car. Castings, or other heavy parts are placed on this car by the crane and pushed into the filler room where there is a three ton Wright crane for handling the castings. Steel bars are also removed from the delivery trucks by one of the cranes, when necessary, and are stored on racks at one side of the bay, near the entrance. From this end of the new building, the flow of production is toward the shipping department in the old portion of the plant, and out to the railroad spur.

As will be seen from the diagram, there are five bays in the new part of the plant. At one end of the extreme right hand bay is the filler room already mentioned. The castings, etc., come in at one end as explained, are moved as desired by the travelling

crane and, after the surfaces have been filled and prepared for machining, they are taken out into the bay to the heavy machinery, on a push car on tracks

Railroad Spur

Shipping Experimental Poom Testing Testina OFFICE Assembly Bay Dept Assembly Bay Stock Room Production Engineering Department Tool Room Dert Filler Room Track

from the other end of the filler room. From this point, the castings are moved by means of the large crane and placed on the heavy planers or boring mills in that bay. This bay is also provided with a one ton travelling crane with manual hoist for handling lighter parts and castings. It may also be used to

mount jigs and fixtures on the machine tools.

That portion of the extreme right hand bay not occupied by the filler room contains large mills and drills. This is served by two one ton Wright travelling cranes equipped with power hoists so that the need of manual handling is reduced to a minimum. In fact, all departments in this plant are adequately provided with mechanical handling equipment which greatly facilitates handling and saves much time and labor.



The turret lathes are located in the center bay. This is provided with a single one ton Wright travelling crane with a hand hoist. As the parts in process of machining here are small, the one small crane suffices. The next bay to the left has the engine lathes and grinding tools. The parts to be handled here are small and one crane similar to that in the adjacent bay is enough. Small mills and drills are located in the extreme left hand bay, which is also provided with a one ton Wright travelling crane with hand hoist.

There is also a tool room for the making of jigs and fixtures and various tools. The variety of machine tools in this department is very complete. Most of these machines are equipped with individual jib cranes with chain hoists to provide for ready handling of the work.

The various parts made in these bays come together at the end of the building and go either to the stock room or directly into the assembly room. Small parts are moved in boxes on skids with the help of hand lift trucks. The heavy castings are taken into the assembly room on dollies.

There are two bays in the assembly room and each is provided very adequately with mechanical handling equipment. In the first of these bays is a three ton Maris travelling crane and a pair of two ton Yale cranes. The other assembly bay has a three ton Wright crane, a 1½ ton Yale crane and a half ton Brownhoist.

The need of mechanical handling is obviously less in the test room, as the machines are of course fully assembled when they reach this department. All that is needed is some means of quickly and easily loading them with work or fixtures, or both, for the test runs and, where motors are not a part of the order, to mount a motor temporarily and remove it when the test has been finished. Two Yale hand-operated monorail hoists, serving each of the two test lines, provide the necessary facilities.

The paint spray booth is adjacent to the test department, and the shipping department is next to the latter. The shipping department has an opening on the railroad loading dock.

It is interesting to note that this is not a quantity production plant. The number of machines finished per day is not large but the accent is strong on quality. At the present time, of course, the plant is under pressure to turn out as much as practicable, and while this condition is met by extra shifts, it is also helped materially by reducing waste of productive ma-



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chine time to a minimum with the help of mechanical handling equipment. It also helps to keep down the cost of quality production. That the importance of properly selected and installed mechanical handling equipment is recognized by the management, is shown by the very complete installation in this plant.

### Electric Hoists On Assembly Line

When the Divco-Twin Truck Co., built the first unit of its modern plant, assembly lines were designed so as to make a wide use of overhead cranes and hoists. With this series of interlocking cranes it is possible to assemble and store parts in one bay and transfer them into another bay without re-handling and with minimum cluttering of aisles.

Raw materials are received by rail or truck at one end of the building, where they are handled by a 3-ton electric crane operating on a 120-ft. crane runway. This crane is operated by a remote push-button control. A man, standing on the floor, safely out of the way of the heavy load swinging along overhead, may guide it in any direction he chooses. After weighing

and recording, the various parts—axles, motors, wheels, tires, etc.—are dispatched to different bays according to their classifications to await assembly. Two overhead cranes, each having 30-ft. spans, equipped with electric hoists, and being operated from the floor, handle these parts from the receiving zone to their respective storage places. Sheet steel for body fabrication is moved to storage piles by the 3-ton crane used for unloading. Chassis frames are handled by a separate crane while they are being assembled, washed, and painted, before going to the assembly line.

Plywood floors of the trucks are cut to pattern with electric saws and routers, and drilled and assembled with electric tools. A hoist is used for dipping them into a staining bath, after which they are placed on a four-wheel dolly, the sides attached, and the unit carried aboard a floor-type conveyor 165 feet long to the head of the final assembly line, there to be placed on the chassis by an electric hoist.

The final assembly line is a floortype conveyor some 345 feet long, the various sub-assembly lines and departments being located along both sides at points where the different parts will be needed. In the first crane runway, the frames are assembled and after





DOUBLE-LIFE Blu-Mol-new Millers Falls machine hack saw blade-is an old dream of metal-working men now come true through advanced engineering ideas and improved heat-treating technique. Use of both edges as cutting edges is a natural idea, but presented certain problems of practicability. It has remained for Millers Falls to make it work. Severe tests on 'many classes of jobs have already proved DOUBLE-LIFE's unprecedented practical economy. Two new developments make it possible: a set differential between first edge and second, preventing drag and wear formerly an obstacle; and soft-center heat-treating,

Doing twice the work of the finest single-edge blade, DOUBLE-LIFE costs you only half again as much—netting you at least 25% savings on cutting costs from its first day in your shop...giving you 33-1/3% more cuts per dollar!

GUARANTEED UNBREAKABLE!
GUARANTEED SHATTERPROOF!

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We've backed up our faith in DOUBLE-LIFE with an investment of thousands of dollars in new production equipment. Yet you can prove the value of DOUBLE-LIFE and begin to share its benefits by spending only a dollar or two. The DOUBLE-LIFE distributor in your territory can show you this remarkable blade. See it in action . . . start now to save.

### HOW IT WORKS

Blade is placed in machine in usual way with first cutting edge (A) down. As blade is submerged in slot, trailing edge (B)—set narrower than leading edge—clears walls freely, undamaged, unworn. When first edge (A) is dulled, blade is removed, inverted, and returned to machine with second (B) edge in cutting position. Second edge cuts as fast and as free as first edge.

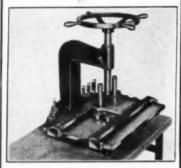
# DOUBLE-LIFE Hack Saws



eliminating breakage.

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# Save TIME APS ROUBLE with the New VIKING TAPPER



You save time because the Viking Tapper eliminates the wasting of valuable time by highly paid skilled men trying to tap holes accurately by hand. One fifth the time is required.

You save taps because tap breakage is practically done away with. This enables the use of high speed gr-und thread taps at lower cost than carbon taps. The savings on taps alone will pay for the tapper in a short time.

You save trouble because Viking Tappers take the trouble out of tapping.

For Precision Tool Room Tapping use the Viking Tapper. Capacity 1/4° to 3/6.

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# THE VIKING TOOL & MACHINE CORP.

14 MAIN St., BELLEVILLE, N. J

the side members have been installed. each frame is lifted by an electric hoist and placed directly back of the assembly line, where another electric hoist picks up the frame and sets it on an assembly buck ready for movement onto the line. In the next bay, axles are stored, as well as springs and other heavy parts. They, in turn, are handled by an electric hoist in moving from storage to the proper positions on the frames. At this point, a special turn-over fixture picks up the frame and, turning it over, sets it on the chassis assembly line. As the chassis moves along, a third crane, serving the motor storage is used for placing motors in position on the chassis.

Farther on, at a point where the body conveyor meets the assembly line, an electric hoist picks up a body and swings it into place on the waiting chassis. A shell and radiator assembly is located close to the body lift. And so the orderly assembling of each truck progresses. The procedure is not unlike that found in automobile plants, with the exception of the notable difference in the handling of bodies which are brought into close proximity with the assembly line, to be lifted onto the chassis by an electric hoist installed for that purpose, rather than transported from some distant point in the plant by a traveling crane and lowered from above. Then too, by the arrangement of cranes and interlocking spurs, , a hoist from any bay can be transferred from one crane to another.

### **Packaged Crane Assemblies**

An interesting new development contemplates packaged crane components known as "Budgit Crane Assemblies." From them, traveling bridge cranes and jib cranes can be built by applying the assemblies to a standard section I-beam.

A unique feature emphasized is that the only tool required to complete a crane is a wrench. There is not a single hole to be drilled, nor is there any machine work to be done. It is asserted that any of the types of cranes which can be made from the assemblies, can be completed in an hour's time.

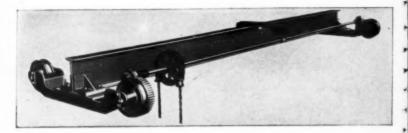


lant of Armstrong-Blum Mfg. Company, Chicago. Here 4 different types of kilsaw Tools help to speed up the manufacture of the famous "Marvel" hackw machines. Skilsaw Tools throughout the plant help to get the machines ut faster . . . help to build them better . . . help to produce them at lower costl

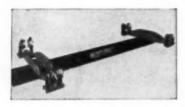
SKILSAW, INC., 5035 Elston Avenue, Chicago



SLADLY DEMONSTRATE THESE TOOLS ON



These new 'lines make available to industry, modern jib and small bridge cranes that can be obtained from a dealer's stock and placed in service the same day they are ordered. All parts for building a top running, geared



type traveling crane bridge are included, except the I-beam and shaft. The bridge crane is shown in Fig. 1.

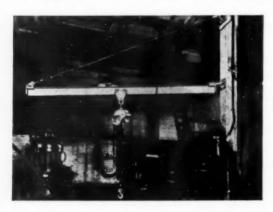
The swinging bracket jib crane is shown in Fig. 2. All parts are attached to the I-beam without drilling or machine work. From this assembly, 36 standard sizes of jib cranes can be built. It is unnecessary to locate the top and bottom bearings carefully because a flexible and adjustable tension member is employed.

The underhung bridge crane assembly comprises two completely assembled end trucks as illustrated in Fig. 3, which are attached to an I-beam.

### Streamlined Hand Lift Truck

A streamlined version of the single stroke "Blue Streak" hand lift truck for handling 2,500 lb. loads is now available.

A new type balanced tubular handle, with comfortable fitting hand grip,



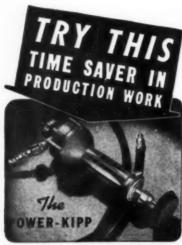
At top of the page is the Top Running Geared type Bridge Crane—Near center of page is Fig. 3, the Underhung Bridge Crane. At the left is Swinging Bracket Jib Crane — all built from Budgit assemblies.



# JACOBS CHUCKS

The National Standard for National Defense THE JACOBS MANUFACTURING CO., Hartford, Conn.

"If it's a Jacobs — it holds"



# KIPParGRINDER

The Power Kipp Model VT, has a controlled speed of 12,000 R.P.M., takes wheels up to 2½" diameter, discs up to 4¾". Production executives find it a time saver in production work, as great as the high speed Kipp Air Grinders in Too Room Work. VT sells at 558.75, other Kipp Air Grinders sell from \$9.75 to \$40.75, Chippers and Filers at \$19.75. Kipp Air Tools give you highest speeds, lowest prices. New Catalog gives details.

O DAY	FREE TRIAL
Name	Send Power Kipp Model VT on your 10 day Free Trial Offer! Send the New Kipp Air Tool Catalog!
Company	

tubular shaft and lower handle casting welded into a single unit, prevents parts from working loose. Enclosed handle balancing mechanism keeps handle in an upright position, prevents tripping and relieves the operator of handle weight.

A new counter-balanced load retaining hook, which eliminates the necessity for springs, grips a roller latch, holding the load in positive lock while elevated. The roller latch, in addition to eliminating wear, also permits trigger action release of load.

Loads may be elevated with the handle at any point within a 90° arc. Steering may be accomplished around sharp turns since a new full 180° steer is provided.



Steering column now operates inside a special steel bushing and a hardened steel washer has been inserted between head casting and wheel fork to minimize friction.

The compound (articulating) lifting mechanism that changes the lifting ratio, flattens out the lift curve and reduces lifting effort has been retained. Also the keyed, high-carbon, chromemanganese, hardened steel axles, the hydraulic release check that cushions descending loads, the welded, single-

# SUNDSTRAND BENCH CENTERS

... Speed Up Gauging and Straightening Operations





# Precise, Portable, Practical



Write for Bulletin 436

Bulletin 436 fully describes Sundstrand Bench Centers and Balancing Tools, giving capacities, weights and other information. Mailed promptly on request.

Used extensively in tool rooms, repair shops, and production departments on inspection and straightening operations; Sundstrand Bench Centers provide a handy, rapid, economical means for checking work accurately between centers. Rigid, portable: Sundstrand Bench Centers can be placed on a bench or stand convenient to the work. Heads are adjustable, locked by lever-clamp gibs. The right-hand spindle is spring-loaded, with retracting lever for quick work-handling. Hardened and ground steel centers are an accurate taper fit in spindles. Use Sundstrand Bench Centers to speed work, save money. Seven handy sizes range from 6" x 18" to 12" x 60".

DEALERS - Sundstrand Bench Centers, Balancing Tools, Airport Equipment, and manual Index Bases, are Open Line Tools; offering big value, excellent sales opportunities. Investigate.

Sundstrand Machine Tool Co. 2535 Eleventh St., Rockford, Illinois, U. S. A.

# RIGIDMILS - STUB LATHES

Tool Grinders Drilling and Centering Machines Hydraulic Operating Equipment - Special Machinery



unit load frame with rounded safety corners, and the heavy-duty machineturned wheels mounted on Hyatt roller bearings.

The truck is made in two models—wide and narrow frames—each with capacity of 2,500 lbs.

### A New Lift Model

A new addition to the line of "Pul-Lift" portable hoists has a capacity of 4½ tons so these units now may be had in a complete range from ¾ to 6 ton capacities. The intermediate sizes have capacities of 1½, 3, and 4½ tons.

The new 4½ ton unit has the same safety and construction features as previous models. It is easily portable, yet rugged enough to more than adequately care for the jobs within its rated capacity.

The roller chain is specially designed and has an ultimate strength nearly five times the rated capacity of the hoist.

It will operate equally well in horizontal or vertical position and may be used for pulling or lifting.

Yale safety hooks are featured. In case of severe overload, these hooks open slowly, without fracture, giving ample visual warning of danger and protection to the operator, the load and the mechanism.

For operation in close quarters and tight out-of-the-way places, a ratchet handle is provided with universal action. Short, easy strokes at any point within a complete circle permit operation in cramped quarters.

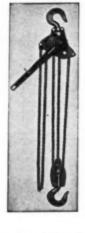
It is claimed that possibility of flying handle is decreased to a minimum by the self-actuated load brake. As the load is increased, brake pressure increases in direct proportion.

### A One Man Crane

A new type of Tramrail Carrier, with raise-lower cab is available in two general forms. One form provides for the raising and lowering of cab and load together. The other provides for the cab and load raising and lowering independently of each other. Which type to use is contingent upon the service and materials to be handled.

With a raise-lower cab unit, one operator may take care of all operations involved in moving materials with an electric cab-controlled overhead tramrail system: attaching load to crane hook, detaching, and operation of the tramrail unit. If the materials are of such nature that a lifting fork need be employed, one operator can also handle the entire job just as with a crane hook.

The unit illustrated handles unwieldy loads of cork. The cab and load hook are operated independently of each other. During the day shift, when





Self Centering ... Quick Acting ... No Slip. Attaches to any chuck plate or spindle. Provides a slip-proof, balanced drive reducing chatter. Handles rough forgings or turned pieces—straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.

SENECA FALLS MACHINE CO., 314 Falls St., Seneca Falls, N. Y.



# You're Money Ahead with Haskins!

The Service Caster and Truck Company is one of the many prominent users of Haskins Flexible Shaft Equipment. Here in their Albion, Michigan, plant Haskins Equipment Type of is a content of the state o

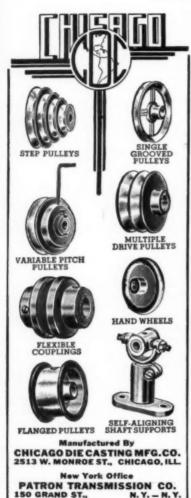


THERE ARE TWO REASONS WHY you'll find Haskins Flexible Shaft Equipment doing so many different kinds of jobs in so many different kinds of plants. First is the fact that this really complete line offers 30 different types of equipment—with mountings, motors and drives to make any tough job easy. Second is the fact that each type of Haskins Flexible Shaft Equipment is designed and built to do so much work for so many years that it will probably outlast the job you bought it for!

Is there grinding, sanding, filing, buffing or wire brushing to be done in your plant? Catalog No. 45, containing complete details about Haskins Flexible Shaft Equipment, will give you some money-saving ideas. Write for your free copy. R. G. Haskins Company, 623S. California Avenue, Chicago.

HASKINS

FLEXIBLE SHAFT EQUIPMENT



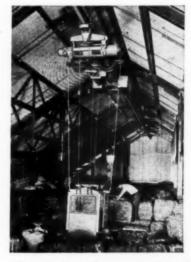
**Minneapolis Office** 

H. A. HOLDEN CO.

300 4th AVE., So. Minneapolis, Minn.

CATALOG ON REQUEST

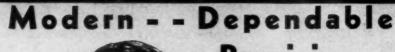
large quantities of cork are required to keep up production, the cab is kept in the upper position firmly attached to the tramrail carrier. Three men are then employed; one for attaching loads, one for detaching at receiving end, and the third for operation of the Tramrail unit. During the night shift when the demands for materials are not so great, the cab operator alone, through use of the raise-lower cab, takes care of the entire job.



The unit shown has a vertical travel of 40 feet for both cab and hook. Equipment can be furnished for operation from much greater heights if desirable. The load hoist, cab and carrier are all motorized and controlled from the cab. This particular unit is so arranged that it cannot be traveled until the cab is in the high position.

### Hydraulic Hand Lift Truck

Featuring easier lift, easier steer, greater safety to operator, lower maintenance and controlled lowering of loads—the "Load King" is built for continuous heavy-duty service. (Capaci-



Precision Tools

> essential equipment to give profitable production with today's demands for Speed and Accuracy in the Defense Program

> > —Select your Machinists' Tools with confidence from the Brown & Sharpe Catalog . . . Micrometers Rules Combination Squares Bevel Protractors Straight Edges Vernier Tools Gages Dial Test Indicators

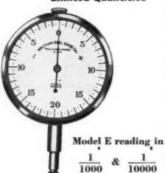
Speed Indicators V Blocks Calipers and Dividers

BS Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

BROWN & SHARPE TOOLS

# **Immediate Delivery**

**Limited Quantities** 



Also Midget Indicators & Pocket Gages.

Waltham Dial Gage Co.

SAFETY
EFEDER
KEEPS
HANDS
OUT OF
DANGER
ZONE

PRESSING trigger creates strong vacuum in cup for holding flat-sur-face materials for feeding to press. Releasing trigger releases piece held. Keeps hands out of dangerzone. Single and double-cup types.

ASK FOR BULLETIN 9-C.

F.J. LITTELL MACHINE CO.

ties -3,500, 5,000, 6,000 and 8,000 lbs.)

The hydraulic lifting unit is self-contained and totally enclosed. There are no needle valves. The pump unit has automotive type piston and piston rings for maximum pressure. Hardened and ground automotive type poppet valves, operating on hardened and ground valve seats are incorporated for trouble-free operation.



The large diameter lift ram is of solid steel, precision-ground and polished. Operating in a cylinder equipped with chevron leather seals encased in bronze bushings, it maintains oil pressure to support loads in elevated position. The large size ram is claimed to lower oil pressure 50%, increasing packing life and reducing possibility of valve leakage.

The hydraulic unit has a five (5) pint oil reservoir, asserted to be 5 years' supply.

The one-piece frame serves the double purpose of elevating platform and elevating frame. Front head and wheel fork are heavy section steel castings, precision-machined. A large Timken thrust bearing on the steering column, provides for easy steering of heavy loads.

Wheels on standard models are smooth machine-faced steel, equipped with ball bearings, sealed to exclude dirt and other foreign matter. Full

# 8-12-16 SPEED HEADSTOCKS



# 14 TO 36 INCH Size Range



# **FEATURING:**

Continuous tooth herringbone gear transmission— Four wall bed construction—Automatic lubrication

Let us send bulletin telling about the many other superior SIDNEY features.

# SIDNEY MACHINE TOOL CO.,

# NECESSARY

# A Good Abrasive Wheel Cut-Off Machine In Almost Every Shop



# This CATSKILL Model-W

is the answer to your Cut-Off problems. It is designed to save time and lost motion.

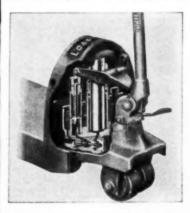
Handles stock up to 3\*. Depth of cut regulated by two-way stop. Swivel vise allows cuts from right to 45° angles. Abrasive wheel and motor is balanced on heavy cast iron "I" spindle frame, eliminating counter weights or balances. Ball bearings in spindle and trunnion are alemite lubricated. Coolant pump is piped and wired separate from main drive.

We invite you to write for further details.

Our new folder is now ready.

CATSKILL METAL WORKS

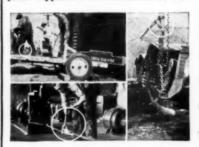
200-degree lifting and steering arc increases maneuverability. Balanced handle relieves operator of carrying handle



weight. Load platform and lifting saddle are of reinforced heavy plate and bar steel—arc-welded into a rigid unit structure.

#### Hand Power Units

A simple "Come-Along" hand power unit of the type illustrated, will be found very useful for many industrial jobs. Applicable for horizontal or ver-



tical pulling or lifting, it is quickly applied. The grab hook is quickly attached to another chain, rope or wire. Anchor hook on other end of body is



meet these emergency requ he Hevi Duty Electric Gas Q ne" utility furnace for-

CARBURIZING - with natural some artiting gases or oil m

- NITRIDING
- **BRIGHT ANNEALING**
- 4. CLEAN HARDENING

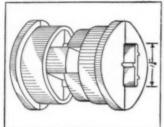
in one" heat treating furnace ajor ligat treating operations and has it place in the small plant as its economy we rante its use hough its operation may not nuous.

# DUTY ELECTRIC COMPANY

6

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Durable Sleeve Construction for Supported Punch.

Do away with the heavy expense usually encountered when replacing thin section, odd-shaped piercing punches on large runs. You can do it when building the die by installing the Durable Patent Piercing Punch, supported with the intermeshing sleeve.

Easy to install, punch replacement becomes a minor operation. The extra expense is more than offset by better holes, increased punch life, and economy of punch replacement.

This construction gives the same satisfying results which are being obtained by hundreds of users of Durable Patent Piercing Punches, supported in the intermeshing sleeves on round holes—performance which has made practical, the piercing of holes that were formerly classed as drilling operations.

Write today for free handbook showing construction of many typical dies used by industrial leaders.

DURABLE PUNCH & DIE CO. 2240 W. Ogden Ave., Chicago, III.

EASTERN OFFICE 1257 Commercial Trust Bldg., Philadelphia, Pa. likewise attached. Operate the ratchet handle and you are pulling. A positive lock is provided in three different positions of the handle. The composite illustration shows the device in use as a winch, skidding machinery and as a hoist.

#### One Ton Electric Hoist

A new one ton capacity unit is announced as an addition to the line of light weight, portable, plug-in type "Comet" electric hoists. Five capacities are now available, viz., 250, 500, 750, 1000, and 2000 pounds.

The new unit is suitable for all types of hoisting service. It is available with hook suspen-ion for quick, easy portability—or with a trolley attached for overhead conveyance. Special heavyduty, high-torque motors are supplied for 110 volt lighting circuits, 220 or 440 volt power lines.



Precision, double plate sealed, permanently lubricated ball bearings are provided at all rotating points. Gears are accurately machined and are made of long wearing heat-treated alloy steel. The load brake is smooth, quick-acting and positive and prevents "drifting" of the load. An emergency brake, plus automatic upper and lower limits, guard against hoist abuse and assure safety.



Rigid quality has reaped its reward... defense industries have found that they can depend on the trouble-free operation of Kellerflex machines and equipment. Their power and flexibility can be used constantly... 24hours a day—every day.

Check the grinding, burring, sanding and polishing jobs in your own plant and remember . . . you can push your Kellerflex equipment to the limit — it was designed for the long, tough jobs as well as intricate precision work.

# PRATT & WHITNEY

DIVISION NILES-BEMENT-POND CO.

WEST HARTFORD, CONN.

Markellerflex Sales Department Markellerflex Sales Department

"One hand" control provides convenience in operation since it leaves the

other hand free to direct the load into position.

### **C-F Welding Positioners**



A device which is helpful in solving still another materials handling problem is a welding positioner of appropriate size and strength. Cranes are very valuable for moving large, heavy steel pieces which are to be After welding has begun. welded. however, it is often inconvenient to use a crane for positioning a piece which is to be welded in a variety of places. Such a practice is likely to tie up the crane while the welding is done, or else waste the time of the welder while he is waiting for the crane to come back. In addition, positioning by such a method often requires four men-the welder, the crane operator, and two men for slinging.

It is usually possible to position such a work piece satisfactorily with a positioner of the type shown. After the weldment is once placed on the positioner and set up by means of clamps, or other holding devices, it should be possible to make a down-hand weld at every point desired without changing set-up.

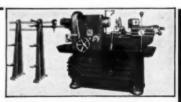
This positioner revolves, under various controls, in a full circle, giving opportunity for proper approach to all sides of the piece. The table and its integral mechanism are adjustable in height. Table may also be tilted almost upside down—from horizontal to 45°

# MOREY No. 2-G Turret Lathe

Motor driven. 1\* wire feed. 6½\* turning length. Designed particularly for the use of modern cutting tools. Handles a wide variety of work at low cost.

Send for your copy of circular No. 629.

Morey Machinery Co., Inc. 410 Broome Street, New York, N. Y.



RANGE: 90 to 1800 RPM or 180 to 3600 RPM

# HARD JOBS MADE EASY

# DoAll

C. A. Weidner & Sons, Rochester, N.Y., are now able to do highly specialized metal cutting jobs that would be difficult, tedious and prohibitive in cost without their DoAll Machines.





Screw Machine Cams, averaging % thick and 8 diam. cut on a DoAll at Remington Rand, Inc., Elmira, N. Y.



Locking Cam and Cam Stop made of oil hardening tool steel cut directly on the DoAll (no die required) by Taylor Instrument Co., Rochester, N. Y.

FREE-Ask for Literature on all DoAll Machines or 158page Handbook on Contour Machining.

# \* SPEED UP DEFENSE WORK \*

Time—that's what we're all working against, not only in our defense program, but in regular industrial production. Wherever metal is shaped, cut and used, the DoAll Contour Machine can effect surprisingly large savings in time, labor and material. It's today's indispensable tool.

# New--Model V-60

A brand new model with three 26° wheels, the third one to give it a throat 60° deep. Handles large size and odd shaped metal parts and products.

Investigate the DoAll immediately. Let us send a factory trained man to your plant to show you what a DoAll can do for you.



Four of these are in use at the Canadian General Elec-

# CONTINENTAL MACHINES, INC.

1300 S. Washington Ave.,

Minneapolis, Minn.



Up to 10,0000 operations per hour are possible with this SPEEDY press. Hour-after-hour, day-after-day performance is easy, for this press has STAMINA. Operators are in 'ess danger, because this press has SAFETY FEATURES ordinarily confined to the larger presses.

This press truly has everything that will help increase production and profits.

Send for more information today.

DAVID J. ROSS CO. BENTON HARBOR, MICHIGAN beyond vertical. The extreme position is often valuable for making down-hand welds on the bottom of cumbersome pieces. Roller stands of proper size are available for handling long piping, tanks, and other pieces requiring end supports.

The manufacturer of this positioner stresses the value of positioned, downhand welds. It is claimed that such conditions make possible the use of larger rods, higher currents, and fewer passes, producing savings in welding time, cleaning time, and overhead crane service. It is also asserted that there is an increasing demand for positioned welds on the part of the government and other buyers.

These positioners are offered in four sizes—capacities are 1,200; 2,500; 6,000; and 14,000 lbs. Table sizes vary from 24" x 24" to 54" x 54". All tables may be removed when desired, as for special jigs or fixtures. The rotating and tilting may be manual or power operated as desired. Power models are equipped with either constant speed or variable speed rotating control. The manufacturer has just issued a new bulletin, which is a comprehensive study of positioning problems.

### Flexible Bearing Catalog

A new folder is available, describing the Torflex (flexible) bearings manufactured by Harris Products Co., 5425 Commonwealth Ave., Detroit. Available in virtually any sizes, the bearings are recommended:—for noise, vibration and lubrication elimination; for impact and shock absorption; for parallel and angular misalignment compensation,

# You Need A Tote Pan

Durable — Liquid tight — 5 gallon capacity — pressed from %6" sheet steel — 21-½\*x13-3%" x 5-3%" inside.



Write for low prices today.

The Salem Tool Co.



- 1. Precision self-aligning ball bearing.
- 2. One-piece sturdy housing.
- 3. Removable end cap.
- 4. No drag labyrinth
- 5. Simple mounting wrench.

Send for new 96-page Catalog No. 440 which gives detailed information on the complete Ahlberg line of Ball Bearings. Roller Bearings and Pillow Blocks.

inexpensive bearing is required.

The full self-aligning, precision type ball bearing, is mounted in a one piece, Parkerized, and accurately machined housing. Seals, to protect the bearing and retain lubricant, are non-wearing Neoprene rings, which turn with the shaft and float in the housing.

This labyrinth I type of seal is frictionless, long wearing, and exceptionally effective.

This series is available in shaft sizes from fa" to 2 70", in either fixed or expansion types. Closed end type is optional,

AHLBERG BEARING

Manufacturers of CUB Master Ball Bearings

3009 West 47th Street

Chicago, III.

# BE PARED To Help Tour Country Prepare!

# Equip Your Machines with FULFLO Coolant Pumps and Relief Valves and Be Ready!

Records prove these pumps and valves can meet the present day requirements of industry.

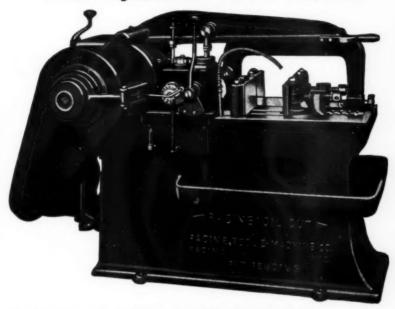
During these rush times when equipment must be pushed to the limit of its capacity, Coolant Pumps and Relief Valves are a vital factor in production.

Let us be of assistance to you.

Send for information on the FULFLO LINE.

The Fulflo Specialties Co., Inc. BLANCHESTER, OHIO

# The RACINE OIL CUT With Hydraulic Feed Control



This fast-cutting new medium duty RACINE "Oil Cut" Saw has a capacity of 6'x6'. Rigid and accurate, it offers all the advantages of modern hydraulic feed and pressure control enjoyed by production plants using the larger RACINE metal cutting machines.

There are many advanced engineering features including: single lever control of feed, clutch and rapid traverse; single dial control of hydraulic pressure, built-in 3-speed transmission, etc.

The new RACINE "Oil Cut" may be equipped with the RACINE Automatic Stock Feed for high speed, economical production of duplicate pieces.

RACINE offers a broad line of rugged, high-quality metal-cutting machines. May we send descriptive literature on the type of power saw you need?

RACINE TOOL & MACHINE COMPANY
1754 State Street Racine, Wisconsin

MARCH 1941

# This is it, Gentlemen! PROGRESSIVE PROUDLY PRESENTS A STARTLING New aluminum Welding



PHASE SHORT WAVE Process

THIS important new Progressive achievement has been under development for a long time. It brings to industry a newer, better, quicker, more economical method of welding aluminum and other ferrous and nonferrous metals. This is NEW and DIFFERENT!

SEE IT AT THE A.S.T.E. SHOW

Also See Demonstration of PROGRESSIVE FORGE-WELDING Method-Booth 370 OVER 250 TYPES OF PORTABLE GUN WELDERS

Complete Engineering Service on Any Type Welding, Punching or Riveting Job.

# PROGRESSIVE WELDER CO.

Engineers and Manufacturers of Welding and Punching Equipment 3050 EAST OUTER DRIVE DETROIT, MICH.

# Arc Welded Fixtures

### By A. S. CURRY

THE manufacturing firm with which I am connected makes vacuum, compressor, and centrifugal pumps. The selling price of these pumps is based in part on machining cost. Tools, including jigs and fixtures, naturally form an important element in our machining costs.

When the tooling cost has been estimated, it is prorated over the number of pumps which the Sales Department estimates it can sell in a year. This prorated cost is then included in the selling price, which has to be based on competitive value. Obviously, it is necessary for engineers to spread economical dollars as far as possible.

My position as Methods Engineer requires the designing of fixtures which will allow machining of the part under consideration in the least practical amount of time. The quantities being machined and the quality of work nec-

essary must also be considered. Two important factors are the materials cost of the fixture and the time needed for its construction.

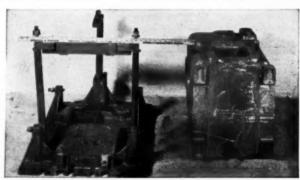
In the design of a certain milling fixture, we changed from cast iron to arc welded steel construction. The use of arc welding resulted in many advantages as well as substantial savings. A detailed account of our experiences with the two types of construction follows:

Cast Iron Milling Fixture

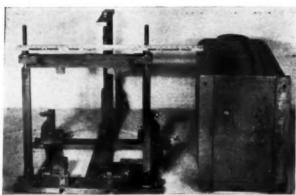
A cast iron fixture was designed for milling the feet of a Duplex Unit Type Heating Pump Tank, of 16 gallons capacity, weighing 417 pounds. Assembled fixture and work are shown in Figure 1. The overall size is 30½" long 25½" wide, and height 28" with the studs and clamps in position.

The work is assembled into fixture by double stud strap shown on top of









fixture and in front of Fig. 1. Two long bolts or studs are first swung out of position, hinged at the bottom of fixture and rear strap is also swung into back of fixture. The work is placed on fixture and is adjusted into correct location by two adjusting screws shown in rear of fixture. After the work is mounted in fixture, two long studs are then swung into position, a double strap placed on top of work and then tightened down on work. The rear strap is also swung into position and strapped down. Adjusting screws shown on sides of fixture are then tightened against work to eliminate any possibility of work shifting when milling cutter is fed into work. The fixture is designed rigidly enough to allow cutters to travel 12" a minute. An 8" cutter with 16 inserted high speed steel cutters is used.

This cast iron fixture cost \$179.16, which total includes 62 hours of labor. A break-down of the cost is given in Table 1.

#### Arc Welded Milling Fixture

When called upon to design a milling fixture for a similar product, we decided to try arc welded steel construction. This fixture was designed for milling a Single Condensation Heating Pump Tank of 20 gallons capacity weighing 386 lbs. The machine space of fixture was 32" long, 29" wide, and

height 32¼"—very similar in size and design to the cast iron fixture already described. The work was assembled into the fixture in exactly the same way as described for the cast fixture.

This fixture was also to be rigid enough to allow cutter to travel at same speed as cast iron fixture—namely, 12" a minute. An 8" cutter with 16 inserted high speed cutters was used, the same as on the cast iron fixture. This fixture was welded with a 300 amp. "shield arc" welder, using a welding rod which was 5/32 and 3/16 diameter, (No. 7 Fleet Weld).

Table 1
COST OF CAST IRON MILLING FIXTURE

COST OF CAST IRON MILLING FIXTURE
Cost of pattern 15 hrs. @ \$2.50 per hr. \$37.50
Machining fixture to
specifications 47 hrs. @ \$2.50 per hr. 117.50
Cast iron for base 356 lb. @ 51/2c per lb. 19.58

Material, incl. machined steel, standard screws and nuts 4.58

Total hours: 62 hrs. Total cost \$179.16

The parts for this fixture were prepared for welding in the tool room. They were cut to correct lengths and milling or drilling was done that could be done more economically before, rather than after, the welding operation. The ease and speed of machining some of the parts at this stage, rather than as parts of a large casting emphasizes one of the points of superiority of welded design.

# CONWAY Gear Tooth Drive DISC CLUTCH

MEDIUM SIZES



**BULLETIN MGT** 

THE CONWAY CLUTCH CO.

1541 Queen City Avenue
CINCINNATI, OHIO

The arc welded fixture cost \$110.39. including 37 hours of labor-a saving of about \$69.00. (See Table 2 for an analysis of the cost.) Costs are not estimated but are based on actual cost as shown by our records. Hours have been uniformly converted into dollars at an average departmental rate (\$2.50) which is based on pattern shop, tool room, and welding department.

### COST OF ARC WELDED STEEL MILLING FIXTURE

Cost of preparing

milling, and drilling parts before welding 10 hrs. @ \$2.50 \$ 25.00 6 hrs. @ \$2.50 welding fixture

Machining fixture 21 hrs. @ \$2.50 52.50 after welding

Material, incl. ma-chine steel, screws, and nuts

17.89 Total cost \$110.39 Total hours: 37 hrs.

Advantages of Welded Fixture

In this particular application, are welded construction showed several advantages over cast iron construction. Probably most important was the substantial saving in cost (\$69.00) already noted. Part of this saving was produced by the smaller amount of material necessary. The principal saving, however, is in actual labor cost-in this case 25 hours or \$62.50,

The saving in time is especially desirable under present conditions because so many plants are "rushed," skilled workers are scarce, and there is often danger of running into expensive overtime work. The welded design in this case does away with waiting for a wood pattern to be made. This factor and the small amount of labor required should enable the welded fixture to be made ready for use in remarkably short period of time.

The arc welded fixture weighed 306 lbs. as against 380 lbs. for the cast iron This made for greater ease fixture. of handling when machining and also when the fixture was completed and put in use.

Gray iron fixtures will show considerable wear and need to be remachined more often than steel ones. Project-



ing parts on cast iron fixtures are sometimes broken off accidentally in handling. This is less likely with steel, and if it should happen it can be rectified more easily.

The flexibility of arc welded construction appeals strongly to the designer. Alterations in a fixture are sometimes desirable or necessary, as when another part must be machined from the same fixture. With cast iron design, a section has to be milled off and the new part screwed and doweled to the fixture. With arc welded design, it is necessary merely to remove the part by cutting with a torch and weld on the new part.

### Machine Tool Industry's Story

How the nation's machine tool industry is turning out lathes, milling machines, boring mills, planers and other types of machine tools for Uncle Sam's defense program at the rate of \$650,000,000 a year, almost four times the production rate of the peak year of 1929, is told in a booklet entitled "Machine Tools" just published by the National Machine Tool Builders Association, 10525 Carnegie Ave., Cleveland, Ohio.

The industry, the booklet states, has been training and employing new men so that millions of dollars worth of new equipment as well as all existing equipment can be used night and day, and has doubled its employment in 15 months.

The booklet describes the part that machine tools are playing in the national defense program and tells what machine tools are and what they do.

A 24-ton automatic machine for roughing out marine engine cylinders is featured in the booklet as illustrative of special-purpose machines being built by the industry to speed up defense production. Operating on six cylinders at one time, this new unit has cut machining time per part from four hours to less than 35 minutes.



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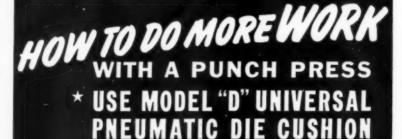
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MINNEAPOLIS, MINNESOTA

# Piercing and Burnishing

### By J. A. SMITH

A LMOST every mechanical improvement, when first developed, appears to be the last word in its field. Usually though, it proves to be only a preliminary step. Such has been our experience in connection with our piercing punches supported in inter-

meshing sleeves.

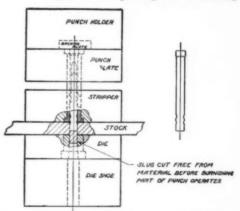
This punch was first designed to pierce holes which previously had been regarded as drilling opera-The first punches tions. were ground with a standard grind. Being used principally on difficult operations, it was suggested that vertical lapping to a super finish, for removing grinding lines, would improve their performance. This it did, but not to the extent desired, as the heat generated in piercing heavy material, caused firing regardof how hard the punches were made.

To improve this situation, the next step was to chrome plate the punches over the super finish.

which improved punch performance tremendously. Difficult jobs which averaged 20,000 holes per punch, showed an extended life of fifty to sixty thousand holes; but chrome plating without the super finish underneath apparently did not add to punch life whatsoever.

The chrome plating of the punches led to our supplying chrome plated burnishing punches, which in turn, opened an entirely new field for us—the piercing and burnishing of a hole with the same punch, with the punch supported in our design of intermeshing sleeve.

The illustration gives a clear-cut picture of the piercing and burnishing



punch in operation. The hole in the die is only 2 or 3 tenths of a thousandth larger than the finished size of the hole. The piercing end of the punch is ground small enough to give the proper clearance for the material being punched.

The piercing part of the punch is ground a sufficient distance to make sure the slug is free before the burnish-



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BUILDERS . PROVIDENCE

ing part of the punch commences to operate. In most cases where it has been substituted for a piercing and shaving operation, it has given a better and more satisfactory job. Where it is being used on jobs which were formerly pierced and then burnished in another position on a progressive die, it reduces initial die cost, and eliminates the necessity for accurate registration for burnishing, as it is correctly registered when the hole is pierced, and the burnishing is accomplished by a continuation of the press stroke.

The advantage of using punches supported in intermeshing sleeves becomes apparent when you realize that this sleeve - supported punch requires less than normal clearance. This means that the hole is practically straight in piercing, and very litte enlargement is required for the burnishing.

Some companies are also using this style of punch on slots which they formerly pierced and shaved or broached, with completely satisfactory results.

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CINCINNATI, OHIO

# Automatic Cam Milling

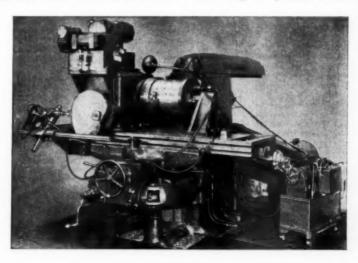
### By JOHN SMITH

A NEW method of milling automatic screw machine cams by means of a duplicator controlling a standard milling machine has resulted, in one application, in time savings of over 80% and a 50% reduction in hand finishing time. It has also released a machine operator's helper for other work—an important consideration in the current defense program.

The process, which employs a standard duplicating control mechanism, is in use at a Rockford, Ill., plant. No special training is necessary on the part of the machine operator. The setup is employed for three cam milling operations:—cam drum, stock feed and cross feed cams. After the cam drum

is set up, the other cams are merely bolted on the drum, so the equipment can be used economically for low production runs. In this instance cam drum milling time is said to have been reduced by over 7 hours, with considerable savings being made on the stock cross feed cam milling operations.

The illustration shows the milling machine with the cam drum path already completed. The duplicating control (at right) is attached to the transverse feed while the electrical tracing mechanism is mounted on a bracket attached to the bed in such a position that the finger can follow the contour of the developed cam. As the cam rotates (during the operation of the ma-





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And on irregular shapes, where hand guiding to a scribed line is necessary, Quickwork 62-A will perform at a rate of 2½ to 10 feet per minute.

Quickwork 62-A is but one of many models built to handle from the lightest sheet metal up to 2\* steel plates—all at a speed the name "Quickwork" implies.

If you want more speed—more production in your metal cutting operations, write, phone or wire Quickwork-Whiting, Division of Whiting Corporation, Harvey, Illinois. Shipment of many standard models is possible from stock. Quickwork consulting engineering service is available to you without cost or obligation.

WHITING CORPORATION

QUICKWORK

chine) the tracer transmits a continuous series of interrupted electrical impulses to the solenoid controlled hydraulic valve in the duplicator control. Through this means the table feed is moved as required.

Once the cutting tool feed is set by the operator, it requires no further attention during the course of one complete cut. Cutting the cam path from the solid in two cuts is said to require but 90 minutes with the new process, as compared with a total of 9 hours for operator and helper with previous manually controlled methods. Depth of cut of the cam path is about \( \frac{5}{6} \) with a width of 1\( \frac{3}{4} \) inches.

The stock feed cam is then bolted to the drum and from ½" to 3/16" of stock cast iron removed in one cut. The time required for this operation is only 25 minutes as compared to a previous total time of 2 hours and 48 minutes.

Two different cross feed cams are then milled in similar manner except that they are machined two at a time. On one of these, however, a considerably greater amount of stock is removed. This is due to the fact that both are milled from the drop forging. This operation requires but 13 minutes as compared with a previous total of 20 minutes.

It is asserted that an additional advantage in the use of the duplicating control is the greater accuracy of operation, which has resulted in substantial reductions in hand finishing time.

### Shock Resisting Tool Steel

Jessop Steel Co., 603 Green St., Washington, Pa., has just published a new 6-page folder describing their "Top Notch" shock resisting tool steel. This literature is of special interest to makers and users of chisels and pneumatic tools—as well as other tools and dies for cold work or semi-hot work applications where resistance to severe and repeated impact is important. Contains complete information on the heat treatment of Top Notch.



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The NICHOLS Hand Milling Machine is ideal for small part milling. Its rugged design and inbuilt accuracy make it an indispensable, modern, high production tool. It features speedy set-up in a precision machine which permits you to take full advantage of high cutting speeds.

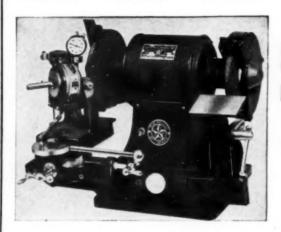
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Precision ground drills cut faster and last longer—do better work and trim production costs. That's the kind of drills you can have with a STAR Precision Drill Grinder.

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3. The first pumping stroke produces tons of ram pressure because the hydraulic cylinder was automatically filled with oil in operation No. 1. A few succeeding strokes build the pressure up to the rated capacity.

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Two Speed Pump-Single plunger action (B) for easy operation at high tonnage pressures.

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In visible proof of "Keeping the Pace", the Severance Company within the last few months has built a new factory—is adding facilities to assist deliveries of new cutting tools and for a speedup in its regrinding service—and naturally is training new craftsmen for this Severance Cutter Service to the Metal, Wood and Plastic Industries. But even now delayed deliveries are in evidence which reflects the probability of greater expansion.

The Severance Company accepts the relative challenge of "Keeping the Pace", and will do its part to meet national industrial demands.

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MIDGET MILLING CUTTERS "Ground from the solid after hardening" to meet your particular needs.

## The Scrap Problem

#### By FRANK V. FAULHABER

S CRAP metal represents an important item in the metal stampings plant. In the course of a year, waste can mount until it becomes a serious item, increasing the overhead and lessening the profit. Foresighted management leaves no stone unturned in striving to reduce waste, provide cleaner workrooms and better-operated departments. To a great extent, the answer lies in a logical solution of the scrap metal problem.

A dependable gauge toward improvement is a good record book wherein can be entered, the various wastes of different scrap metals. There should be columns for the kinds of scrap metals, at what price sold, to whom, when, and also the percentage of scrap in relation to the different orders or instruction sheets, employees and machines. Such a handy record book, faithfully and regularly used and referred to, can serve as guide to advisable changes, wherever these may be necessary in the metal stampings plant.

If, for instance, there is a greater percentage of scrap metal in comparison with the amount of stock used covering a given order, the record book will indicate as much. This record book should be handled by the department foreman or his assistant. Sometimes the office maintains a special record book for its own purposes. In any case, the metal stampings plant cannot know too much regarding its scrap metal problem and anything exerted in its interest will be rewarded.

In too many metal stampings plants—notably the smaller shops—there is more scrap waste than efficiency dictates. First of all, there may be faulty designing or arrangement of plates, discs, dials, gauges, and the like, when, for instance, prints are assembled for reproduction and later blanking out or cutting, in a name-plate factory. The draughtsman, or whoever is assigned to this work, should arrange the photo prints advantageously, so that, in the final metal cutting operations, there will be as little waste stock as possible.

Sometimes, especially in the case of small orders, two or three different plates or orders can be arranged, for printing, on the same sheet, to cut and work metal to better advantage. It is simply a matter of careful and thoughtful collection of designs, giving consideration, of course, to convenience of punching holes and blanking out. By assembling three different orders in preparation for one printing, the work as a whole, thus is facilitated.

Each employee should be responsible for conserving his share of the metal scrap. In one large, successful metal stampings plant, the management discourages unnecessary metal scrap on the floor. Employees are encouraged to pick up scrap and to place it in the proper containers. Thereby, instinctively, employees are taught to manifest proper regard for the scrap metal. The men learn the value of metal scrap, and naturally do all in their power to eliminate unnecessary waste and losses.

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Sutton DIAMOND-GRIP Collets are expertly designed and accurately machined to suit the specifications of each make and size of screw machine. They all have Sutton diamond serrations that grip tighter under less tension. Only Sutton Collets are diamond-serrated.

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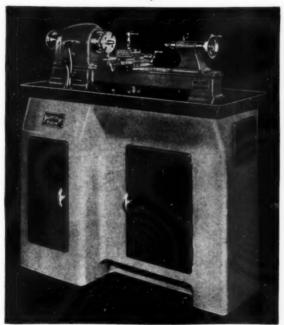
Proper containers should be provided for different kinds of metal scrap. The metals stampings plant, for instance, may use but a minimum number of copper sheets. Hence, no extended effort would seem advisable to separate the copper scrap into two divisions: "clean" "dirty." Clean metal and scrap should bring under this head. such metal as is free of oxidation processes or printing and not combined with other metals or parts of manufactured articles. Dirty metal should be made up of discarded or spoiled printed work, and metal pieces having printing, paint, etc.

Clean metal brings a better price. For the small shop, the variance may seem negligible. When any appreciable amount of metal scrap is collected, however, the importance of careful separation becomes evident. For the large metal stampings plant, manufacturing on a production scale, the difference even of ½c in price for scrap metals can mean worthwhile savings.

The metal stampings department should provide individual receptacles for aluminum scrap also for copper, brass and zinc, for example, with separate divisions according to the products manufactured and the methods followed in selling the metal scrap. Inexperienced or indifferent employees should be cautioned and instructed not to mix the different metals, to prevent difficulty when selling. A new employee, enlightened at the proper time, will be a better worker. He will see to it that no metal scrap is swept out; and will place the different metal pieces in their proper containers.

A higher price may be obtained, perhaps, for large metal scrap, in contrast with other scrap that runs decidedly smaller. In such a case, naturally, a separate division would be in order.

Some plants have a special room or place for retention of waste metals. Everything is arranged systematically. Each metal is kept in its proper place. In conjunction, the management mainElgin



Precision

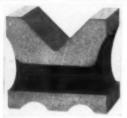
**BENCH LATHES** 

ELGIN TOOL WORKS

Division Of HARDINGE MANUFACTURING CO. 1772 BERTEAU AT RAVENSWOOD AVE. — CHICAGO, ILL tains a figurative string on each kind of metal scrap, to determine the reasons for unusually high waste on a given order. Some plants designate authority to one individual, who is responsible for the metal scrap room. The investment of such authority would seem advisable, else the plants would not assign such responsibility. It stands to reason that when little or no care is devoted to preventing waste, the losses mount.

Metal scrap should be removed regularly from about the various machines.

#### "TRU-V" BLOCKS



Why Not Save Time-by having enough V-Blocks available at all times in your shop to avoid the delays involved in make-shift set-ups and tie-ups?

"TRU-V" Cast-Iron Blocks are available in five husky sizes:— 4', 5', 6', 8' and 10'. Each block is carefully machined on all sides, with close limits held within .001' where re-quired. A machined ledge on both sides provides for clamping on machine bed.

> Let us send descriptive bulletin. Or contact your mill supply dealer.

Oliver Motorcraft Corp. 2532 S. Wabash Ave., Chicago, Ill. This procedure is advisable for safety and efficiency. Too much scrap about the presses hampers the operators. A cleaner floor makes for better operation and cleaner work. It has a salutary effect on the workers, also. Sometimes accidents happen on account of heaps of metal scrap about machines. Specific illustration is not necessary; accidents. somehow, sometimes just happen. clean working room is not only a better working room, but a safer one.

When scrap is conveyed to larger boxes for final storage, smaller containers should be set up for proper depositing or fallage of metals, under or near lathes, near the presses, shearing When fine, delicate machines, etc. work is processed, such as silvered dials, highly lacquered and lustered printing or name-plates. should be instructed thoroughly regarding careful handling. When, for example, the man shearing or cutting the finished metal sheets adjusts boxes, or provides other proper care, in back of the shearing machine, the metal strips will have fewer drops. There will be fewer marred or damaged pieces. At the same time, intelligent regard should be displayed for the proper segregation of the various kinds of metal scrap.

The sweeper in the metal stampings department, or other employees responsible, should also be taught regarding his or their respective responsibilities concerning metal scrap and its care. The superintendent of one large, successful metal stampings plant observed recently that a sweeper should not to be expected ordinarily to be



Here's how to get real value from your grinding wheels. Dress and true them regularly. Use Vincent Improved Huntington dressers equipped with Vincent high-carbon tool steel cutters. Your mill supply distributor can supply them, and they cost no more than the ordinary kind.

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THE VINCENT STEEL PROCESS CO.

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and annular roller bearings precision mounted, assure accuracy and long life under severe conditions. Front bearing cone seats on resilient pad—a shock absorber that protects from tool breakage or spoilage of work. Available in taper shank, slip-in, slip-over and spindle types.

THE UTILITY SLEEVE cuts small tools at least 40% (some users report 75%). This removable taper shank tool driver is used with taps, drills, countersinks, reamers, end mills, center drills, counterbores, woodruff cutters, taper pin reamers, etc.

The sleeve is a two jaw collet in action, fitting over the diameter of the shank of tool, which is positively driven by flats or the tang on shank end.



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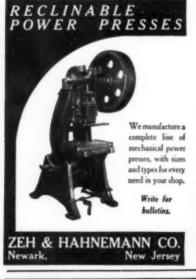
responsible for what he has not been cautioned against. His policy is not to take things for granted. Instead, he himself will take the time to explain a particular duty to an employee.

The metal scrap should be collected and conveyed to the metal scrap room or receptacles, following completion of at least each order or specification sheet. Sometimes the department weighs the scrap resulting from an order, especially on new, unusual work,

to determine percentage and generally in the interests of office and department records. Findings of discrepancies or unusual variances may lead to other experiments and discoveries. Preferred record - breaking depends upon the individual plant and the nature of the work.

If the metal stampings department is not so clean and orderly as it should be, a timely change may bring about a decided improvement. Metal scrap perhaps may be found in out-of-the-way places, where it may have been thrown by carelers workers. It may accumulate behind and under seldom used machines; in corners and in the wrong boxes; under and behind benches. A general cleaning and tidying - up can work wonders. Clean surroundings will help the morale of the men.

In the past, many metal stampings plants may not have obtained the best possible prices for their metal scrap. Perhaps not enough "shopping around" has been done. Perhaps the scrap was sold when the market was low. Per-







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KEYED JAWS— They can't turn or wobble. Drill shanks are bound to be accurately centered every time. Actuating screw only moves jaws up and down—it takes no torsional strain—a big reason for the success of this chuck.

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haps the various metals were not separated properly. Sometimes a better price can be obtained from an out-oftown buyer. Particularly is this so in the case of large production, where it is certainly worthwhile to spare no pains finding a better-paying buyer.

If the market is not "selling" right, the metal scrap should be held until quotations are more attractive. telligent inquiry will oftentimes reveal a better buyer and a better market.

In some metal stampings plants, the metal scraps are weighed by the barrel. allowing so much for the barrel, which is deducted from each weighing. Or. in the case of boxes the weights of the boxes are subtracted. weighing procedure is undertaken, care should be exercised, to avoid errors and losses. Here, too, individual responsibility should be delegated.

Sometimes the management will find it worthwhile to visit other metal stampings plant, to observe how others care for and sell metal scrap. A general swapping of knowledge may be in order, for mutual benefit. ings and discussions, in the interests of this question, will assuredly not go for naught. Individual experiences can be augmented through other observations; through others' ideas, suggestions, opinions and experiments and findings; by the acquirement of "brass-tack" statistics, data, facts-all inspiring information, of use in solving the plant's metal scrap problems.



#### \* THE WONDER CUTTER \*

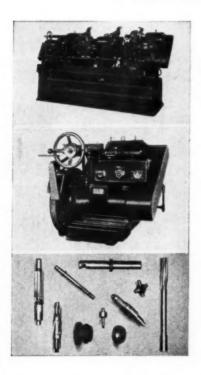
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E. W. Dickett, 1st Vice-Pres., A. H. d'Arcambal, President, and Eldred A. Rutzen, 2nd Vice-Pres.

## Directing the Show

E XECUTIVES and engineers of companies now tooling up for defense are officials at the helm of the forthcoming National Machine & Tool Progress Exhibition and Convention of the American Society of Tool Engineers, sponsors of the exhibition. The chairman of the exhibit committee, responsible for approving all exhibits, especially from the standpoint of their interest and value to national defense

production, is Frank Shuler, General Master Mechanic of the Chrysler Corp., Highland Park plant. Cooperating with him on this committee are Frank Crone, Chief Tool Designer of the Lincoln Motor Car Division of the Ford Motor Co., William A. Smila, Master Mechanic of the Chrysler Division of Chrysler Corp., and Luke E. Beach, Master Mechanic, Detroit Transmission Division







C. O. Hersam, Secretary, Ford R. Lamb, Executive Sec'y., and Fred R. Crone, Treasurer.

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(Left to Right) Frank A. Shuler, Wm. H. Smila, James R. Weaver and Luke E. Beach.

of General Motors. Mr. Crone is also National Treasurer of the Society.

Responsible for the program of the Tool Engineers Convention, to be held concurrently with the exhibition, are James R. Weaver of the Westinghouse Electric & Mfg. Co., Walter Wagner of Lincoln Motor Car Division and Homer Bayliss of the Motch & Merryweather Machinery Co. Clyde Hausse of the Gorham Tool Co., is in charge of plant inspection trips and transportation.

The new President of the "Tool Engineers" is A. H. d'Arcambal, Consulting Metallurgist of the Pratt & Whitney Division of the Niles-Bement-Pond Co., known as manufacturers of the precision tools so necessary to the production of armament and other material. E. W. Dickett, Proposal Engineer of the Sundstrand Machine Tool Co., and E. A. Rutzen, Assistant Factory Manager of Evinrude Motor Division of Outboard Marine & Mfg. Co., are First and Second Vice-Presidents. The incoming Secretary is C. O. Hersam, Consulting Engineer of the Industrial Consulting Engineering Co. Ford R. Lamb continues as Executive Secretary.

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## **Technical Session Program**

COMPLETE airing of needs in all branches of the defense program will highlight the Machine Tool and Progress Exhibition March 25-29 at Detroit's Convention Hall. Held in conjunction with the annual convention of the American Society of Tool Engineers, sponsors of the exhibition, sessions each day will include talks by army, navy and aircraft officials and executives and engineers of industry. Due to the need for education of men not only as to new machines and tools available, but also to operate the machines and tools required for the expanded defense program, the major theme of the convention will be "Education for National Defense."

On Monday afternoon March 24, a special preview of the exhibition will be held for invited guests only, following a dinner for prominent officials of industry and government. Immediately following the dinner, a representative of the U. S. Army will talk on the subject, "What is Needed for National Defense."

Tuesday is designated as Aeronautical Day, the exhibition being open to members and guests of the Tool Engineering Society. The technical session will be held that day in a part of Convention Hall, as will all others during the week. Papers on tooling for aircraft engine and fuselage production will be presented. Representatives of both aircraft engine builders and automotive manufacturers will speak. Wednesday will be Navy Day when talks relating specifically to problems of this branch of the defense program will be presented.

On Thursday, three talks, each bearing directly upon education for defense will be given for the Tool Engineers. The subject will be "The Skilled Help Shortage Problem". A representative of industry will outline what is believed to be needed in the way of education of men from the industrial standpoint. A second paper, to be presented by a government official will explain the government's progress relative to educational plans. A third speaker will discuss what tool engineers have done and are doing to encourage and develop proper educational methods.

The Annual Banquet of the Society will be held Friday evening. The principal speaker at the banquet will discuss the subject, "Expediting National Defense."

Present plans call for the Exhibition to be open from 10 A. M. to 10 P. M. through Friday, and on Saturday March 29th, from 10 A. M. to 6:30 P. M.



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shells. These lathes are especially designed for single purpose

A special carriage carrying a front multiple tool holder and 2 adjustable cut-off tool holders in the rear, arranged with a complete hydraulic cycle is recommended. The front tools are fed into the work, then longitudinally until the shell is turned. Simultaneously the cut-off tools cut the shell to length. Upon completion, all tools are automatically withdrawn and returned to starting point.

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#### Technical Sessions on National Defense

March 25—8:00 P. M.—Convention
"Aircraft Night"

"Aircraft Night"
Subject—"Aircraft Production"
Chairman—Walter F. Wagner, Master Mechanic, Lincoln Motor Car Co.
Speaker—C. W. Van Ranst—Chief Aircraft Engineer, Ford Motor Co.
Subject—"Aircraft Engine Design and Pro-

duction

Speaker-Louis Biehler, Ass't Chief Tool

Designer Vultee Aircraft.

Designer Vultee Aircraft.

Subject — "Tooling for Fuselage Production" (This paper will be jointly prepared by the Lockhead and Vultee Organizations).

C. C. Carlton, Acting Director, Automotive Committee for Air Defense, will have charge of discussion from the floor.

March 26 — 8:00 P. M. — Convention Hall —
"Navy Night"
Subject—"Naval Ordnance Production"

Chairman—Homer C. Bayliss, Co-Manager Detroit Branch, Motch & Merryweather Machinery Co.

Machinery Co.

Speaker—Joseph A. Davies, Chief Planner and Estimator, Naval Gun Factory, Washington, D. C.

Subject — "Planning for Production of Naval Ordnance Units"

Speaker — E. M. Sims, President, Metal Forming Corp., Elkhart, Ind. Member Board of Directors, National Assn. of Manufacturers, Member National Defense Committee.

March 27-8:00 P. M "Education Night" M.-Convention Hall-

"Education Night"
Chairman-Herbert D. Hall, President, Herbert Hall Co., Newark, N. J.
Speakes-P. W. Brown, Ass't Works Manager Wright Aeronautical Corp., Paterson, N. J.
Subject-- 'Industry's Need in Skilled Help'

Speaker—Carl A. Gray, President, The Grenby Mfg. Co., New Britain, Conn. . . Subject—"How Connecticut Solved the In-

Subject—"How Connecticut Solved the Industrial Training Problem"

Speaker—J. R. Weaver, Manager, Louisville Ordnance Division, and Past President A. S. T. E., will describe the
work A. S. T. E. is doing for industrial training and will lead discussion

#### A. S. T. E. ANNUAL DINNER AND MEETING

March 28-6:30 P. M.-Book Cadillac Hotel-

from the floor.

rch 28-6:30 P. M.—Book Cadillac Hotel— Dinner—6:30 P. M. Meeting—8:00 P. M. Chairman: A. H. d'Arcambal, President A. S. T. E., Metallurgist—Pratt and Whitney Div., N.B.P., Co. Installation of new A. S. T. E. National

Officers

Omicers—
Society Reports.
Speaker—L. R. Pennington, Administrative Asa't To J. Edgar Hoover, Director Federal Bureau of Investigation Subject—"How to Prevent Sabotage to Our National Defense Program"

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## No. 16 TOGGLE PUNCH PRESS

The No. 16 TOGGLE with large die space is suitable for punching and shearing tie plates, punching and straightening splice bars, also for general manufacturing press, punching and shearing articles. Drive is mounted inside of frame.

The Press is equipped with magnetic or air clutch. This is a high speed heavy duty Press for many applications.

#### GENERAL DIMENSIONS:

	No. 16	No. 16A	No. 16B
Face of slide, right to left	43*	53*	62*
Face of slide, front to back	24*	26*	26*
Die space, slide down	20*	20*	20*
Stroke; Standard	3.	3.	3.
Maximum	5*	5*	5*
Face of table, right to left	53*	60*	66*
Face of table, front to back	24"	26*	26*
Capacity	700T	850T	1000T
Strokes		35	30
Depth of throat		151/4"	15%
Weight	76,000	82,000	88,000 lb
Motor required Horse Power		30	40

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## Previewing the Show

#### By PAUL ANDERSON

THAT interest in defense preparations will be the main influence at the forthcoming National Machine and Tool Progress Exhibition (to be held in Detroit, Ma:ch 25-29) is shown by the types of tools and equipment the many exhibitors have selected for display. Special effort is being made to show tools best suited for increasing productive capacity, at the same time assuring utmost precision with closest tolerances.

It is sponsored by the American Society of Tool Engineers. The membership comprises the men whose responsibility it is, and will be, to convert blueprints of tanks, airplanes, guns, etc. into actual manufacturing operations.

According to Frank Shuler, of the Chrysler Corporation, and chairman of the Show Exhibit committee, the exhibition will enable the men responsible for specifying and selecting equipment for National Defense work to view under one roof, many of the most recent developments designed to expedite defense production.

"We are endeavoring to make this show 100 per cent useful from a National Defense tooling standpoint," Mr. Shuler said. Allocation of space and permission to exhibit will be granted only to organizations whose exhibited products will be of definite value in simplifying the task ahead for the Tool Engineers of the nation. That task is an enormous one. Thousands of blueprints of designs of 'defense' products

will have to be converted during the next year into sequences of manufacturing operations to produce them. With the tremendous shortage of Tool Engineers existing today, every bit of help these men can get in the way of simplifying their job will mean that much time saved translating defense contracts into mass production.

Among many exhibits already definitely planned is a new production type precision surface grinder, for the rapid surfacing to extreme tolerances of production parts, with absolute control of vertical feed of 0.001" and 0.0001". Quite different is a new infinitely variable speed control unit in sizes for light machinery requiring from ½th to 1½ horsepower. High speed slitting saws, slotting saws for commutators, in sizes ranging from ¼" to 10" and other most modern tools as wide in variety as these examples suggest, will be exhibited in actual use, as will all other machine tools where possible.

Of interest to those rearranging old and installing new machinery will be special set-up appliances which will reduce installation time. In the field of tool drafting, new, easily adjusted drafting tables "built like fine steel desks," tracing files, and improved drafting instruments that will help to reduce layout time and speed up issuance of blue prints will be displayed. Also improved blue printing equipment.

Almost endless are the exhibits of the smaller tools, cutters, files, etc., which will be shown alongside lathes vertical mills, broaching machines and other power-driven tools for high precision, production work. Some high lights of the Show exhibits follow:

#### **Heavy Duty Presses**

Featured in the Minster display in Booth 228, will be three popular sizes and types of Minster Presses. A Minster Straight Side Double Crank Press, representative of the design of a line of presses of this type will be exhibited. This press is rated at 75 tons capacity, 54" between uprights. It includes an air operated synchronizing multiple disc friction clutch and brake, 7" barrel type motorized slide adjustment, totally enclosed dip lubricated gearing and bronze faced slide ways.

Also a 75 ton O. B. I. Press, will be shown, equipped with combination friction clutch and brake unit. In addition an O. B. I., 22 ton press, representative of a smaller line of inclinable presses will be shown. Ten sizes of this type ranging from 12 to 106 tons capacity are available.



#### MILLIONTHS-INCH TOLERANCES

Achieved with Johansson Gage Blocks

Johansson Gage Blocks are the world's highest standard of precision measurement. They measure accurately in millionths of an inch — an accomplishment considered impossible before their introduction.

A full set consists of 81 blocks, which combine to form 120,000 different size gages, in steps of .0001 inch, from minimum size .200 inch to more than 12 inches. Accurate to within ± .000008 inch, ±.000004 inch. Johansson Gage Blocks establish precision without parallel for widely varied craftsmanship.

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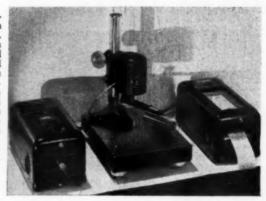
TOOL & MFG. CO...

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Precision METAL CUTTING TOOLS

#### **Checking Surface Quality**

The Brush SA-2 Surface Analyzer wil be on display in Booth 388. This analyzer provides a n instantaneous a n d permanent chart record of surface irregularities of less than one - millionth of an inch. The record shows the actual number of irregularities as well as indicating the number within a certain area. It takes the guesswork out of determinations of surface quality.



#### Drilling Hardened Steel

"Hardsteel" drills for drilling hardened steel will be demonstrated in the Black Drill Exhibit No. 351. Using

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CARDINAL MACHINE CO.
GLENDRIE, CALIFORNIA.

these drills, it is said to be possible to drill, counterbore, countersink or tap steel having a hardness up to 80-82 Rockwell C, making clean holes having the appearance of reamed and polished holes, suitable for dowel pins without additional operations. A drill press, bench grinder and Rockwell hardness tester, with samples of carburized tool steel, oil and water hardened tool steel, armor plate and old mill files will be available to check and test the performance. These drills are available in sizes from 1/64" to ½" in solid Hardsteel metal with straight shanks, and from ½" to 1-½" tipped with the Hardsteel metal, both in straight or tapered shanks.

#### Portable Electric Tools

The complete line of Skilsaw Portable Electric Tools will be exhibited, highlighted by cut-out of tools. Gear construction will be exposed for examination. The Model 80, ½" special duty drill will be featured. This drill weighs 8 lb., has an aluminum alloy frame and is equipped throughout with anti-friction bearings. Of compact design, it measures 11½" overall and is 3½" wide.

# PLUG H. P. LEAKS In Metal Finishing -With Constant Speed-



If production is slipping in your Metal Finishing Department due to overloaded air lines, overloaded line shafts or hose failures, an independently powered MALL CONSTANT SPEED Flexible Shaft Grinder will eliminate these profit-eating leaks and reduce your maintenance costs. The heavy-duty, constant speed and vapor-

proof or ventilated type motor, mounted on a high tilting, swiveling caster base, permits a more efficient motor winding to dissipate operating heat—takes the dead weight from the operator's hands and makes power available in any position.

The interchangeable attachment feature makes this unit readily convertible for *Grinding*, *Sanding*, *Drilling*, *Wire Brushing*, *Polishing*, *Sawing* and other jobs, eliminating the need for single purpose machines and reducing idle machinehour losses.

Write TODAY for FREE Demonstration of a Constant Speed MALL Flexible Shaft Machine in your plant and ask for our new 1941 Catalog of Industrial Equipment.

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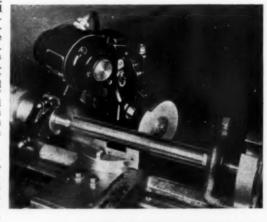
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TODAY.



#### Portable Grinders

The new Dumore No. 18 High Speed Hand Grinder and recently introduced Thread Grinder Attachment will be featured in Booth 143. The hand grinder has an idling speed of 22,000 r. p. m., yet weighs only 41/4 lbs. It is supplied with either a 1/8" or 1/4" capacity chuck. A novel feature is the spun glass air filter which prevents foreign particles from damaging motor parts.

The thread grinder attachment is designed for use with the No. 5 precision lathe grinder. It is a portable unit which mounts quickly on any thread grinding lathe.



The attachment may also be supplied to grind Acme threads.

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We specialize in grinding hardened steel bushings, cam rollers, etc.

Prompt service and quality has retained a large list of customers for 25 years.

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**Electrical Equipment** The new G. E. Tri-Clad polyphase induction motor will be featured in Booth 107.

## Higher Grade Rotary Files. at LOWER TOOL-DOLLAR COST ///

## Ford Hand Cut Rotary Files or Ground From Solid Pay On Every Job M. A. FORD MFG. CO. 413 Pershing Ave., Davenport, Iowa

Also of particular interest will be a new line of fractional horsepower motors designed for machine-tool and industrial applications. These new motors are of extremely sturdy construction and have been designed to meet the severe operating requirements in these fields of use. The ball-bearing, totally enclosed construction is standard for this line.

Another feature will be an operating display of the new speed variator, an all-electric adjustable-speed drive that operates from alternating-

current supply.

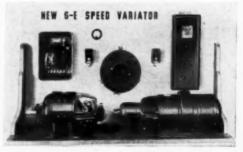
A plugging switch recently announced, will be installed on one of the Tri-clad motors to demonstrate the ease with which a motor, when brought to a stop by reversing the power connection, can be prevented from reaccelerating in the reverse direction, by removal of the plugging at the right moment. Other control devices that are

include push buttons, limit switches, and motor-starting switches.

#### Haynes Stellite Alloy Tools

The excellent red-hardness and recovery-hardness properties of Haynes Stellite alloys for metal-cutting tools will be featured in exhibit area No. 362.

Visitors can actually operate a test



control devices that are to be shown to demonstrate the red-hardness, and

#### LINLEY HIGH SPEED VERTICAL MILLING MACHINE and JIG BORER

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A COST CUTTER ON SMALL PRECISION WORK .. Pays for itself on die, jig and fixture work as well as molds for plastica, metal pattern work, laying out, drilling, milling and boring operations.

Fast and simple with correct speeds to insure safety to end mills. Ball bearing equipped; micrometer screw feed head.

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Blaner Universal Hand SPRING WINDER

Here's a profitable tool room unit. Quickly makes hundreds of sizes of springs. Sturdy, dependable... a real time and money-saver.

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THE JOHN BLANER CO.
Corner Meek & Elm, Sharon, Pa.



The New Departure Div. of General Motors has helped revive bicycling with better bearings and brakes. Dumore Grinders are used in their plants.

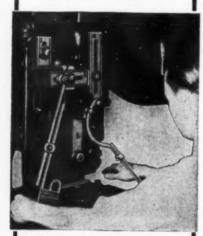


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Grinders

Precision grinding reaches greater importance every day as the demand for accuracy in industry becomes greater. Originally introduced as a tool and die room accessory 25 years ago, Dumore Grinders, because of their wide versatility, have been drafted into use on production lines where they assure a better product while reducing labor costs, overhead charges and spoilage. There's a Dumore industrial distributor near you who will give you full facts . . . without obligation.

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Stop press accidents at the source! Force the men to keep their hands out of the danger zones with this new "Safe-T-Guard". Automatic in action, this guard gently pushes operators' hands out of the way of the descending rams.

Available in a broad range of types and sizes for all kinds of presses. Simple and sturdy in construction. Easily attached. Safe-T-Guards can be depended upon to protect your press operators. They're endorsed by many large users of power presses—by factory and insurance inspectors.

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#### QUALITY HARDWARE & MACHINE CORP.

5849 N. Ravenswood Ave., Chicago

graphs will show both red-hardness and recovery-hardness figures. On display will be a variety of J-Metal and "2400" metal toolbits, welded tip-tools, milling cutter blades, and blades and tools for boring, reaming, grooving, counterboring, spot-facing, and forming. Also shown will be alloy specialties, such as burnishing rolls, centerless grinder rests, and wear strips; and dies and punches which have been hard-faced.

#### Pedestal Tap Grinder

A new model of the Hybco tap grinder is announced. This versatile machine is now offered on cast iron floor base which includes a convenient swing collet rack. Height overall is 52".



The Hybco tap grinder is a universal tap sharpening machine. It will sharpen and relieve the chamfer, sharpen the face of the flutes, and grind special points such as gun, spiral point, chip driver, etc. Each revolution grinds all lands in rotation. Relief is variable,



## WALKER-TURNER OFFERS PROMPT DELIVERY OF HIGH-SPEED PRODUCTION MACHINE TOOLS!

It has been said that "they also serve who only stand and wait." But why wait? If vital production is being held up waiting for the delayed delivery of heavy machine tools, this is an ideal time to investigate the advantages of using Walker-Turner Machine Tools for those operations for which they are suited. It is likely that you will find—as so many other manufacturers have—not merely the solution to an emergency problem, but a genuinely better way to do certain jobs and at sub-

stantially lower cost. Large scale production line methods of manufacture enable us still to offer reasonably prompt delivery of these accurate, durable, dependable machines, in spite of greatly increased demand.

#### WALKER-TURNER MACHINE TOOLS

DRILL PRESSES - LATHES - BAND SAWS - BENCH SAWS - TILTING ARBOR SAWS - IN SAWS - RADIAL SAWS RADIAL DRILLS - BELT AND DISC SURFACERS - JOHTERS - GRINDERS SMINDLE SHAPERS - FLEXIBLE SHAPT MACHINES - CUSTOM BUILT MOTORS

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## Your First Line of DEFENSE against High Sharpening Costs!

Sharpens
4 Times
as Many
Saws as
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Methods

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DETROIT
Booth 407

No. 57T

WARDWELL
Auto: CIRCULAR
SAW GRINDER

Sharpens as many as 250 saws 0.015 in, in thickness at once within a variation of plus or minus .001 of exact diameter of lot. Reduces grinding costs on form Milling Cutters, Slitting and Slotting Saws from 2\* to 8\* diameter. Takes gangs up to 3-¼4 thick with tooth spacing up to 1-¼4 from point to point. Automatically indexes saws one row of teeth at a time with grinding wheel shaped to suit gullet of tooth. Grinds wet or dry.

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THE WARDWELL MFG. CO.

America's Largest Line of Saw Filing Machines
3165 Fulton Road, Cleveland, Ohio

easily adjusted by screws on head, which also change setting for number of flutes.

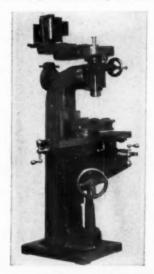
The spindle and cams are hardened and ground; they are fully enclosed and run in oil. Both slides have graduated feed screws for accurate setting. Tap grinding charts are furnished. The taps may be sharpened to same length for multiple tapping.

This pedestal grinder has a base 13" x 16". Height overall is 52". Another floor model features a dust collecting system mounted in base. The popular bench model is still available.

The Hybco Exhibit will be presented in Booth 216.

#### 40-H Vertical Mill

The 40-H Index High Speed Vertical Mill will be featured in Booth 159. This mill is especially designed for the tool, die and experimental shop for milling,



boring and drilling. It has a capacity of ½" to ½" end mills in tool steel, and has six standard spindle speeds ranging from 180 to 2400 r.p.m. with single-

**Applications** 

MOLINE, ILL.



## FOLLOW THE TRAIL TO BOOTH 369 MACHINE AND TOOL PROGRESS EXHIBITION

THE Machine and Tool Progress Exhibition in Detroit, March 25 to 29, could hardly be more timely. In these strenuous days, all the production men of industry are keenly interested in faster and better ways to keep work moving at a rate that will approach tremendously increased demand. And in Booth 369 we will show some of the ways that many of the leading metal working plants are employing to speed up.

Tool and die makers, machine designers and other key men of industry are finding Cerro Alloys real life savers today. These low-temperature-melting alloys which expand slightly on solidifying, are in wide use in scores of applications. Send for further information or visit us in Booth 369.



For complete information send for literature or contact nearest representative or distributor.

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Many Other Applications

**Applications** 

LONDON, ENG. . Mining & Chemical Products Ltd.

CERRO DE PASCO COPPER CORPORATION 40 WALL STREET NEW YORK, N. Y. speed motor. Special two-speed motor is also supplied. It is equipped with longitudinal and cross verniers for lo-

cating milling and boring positions. Spindle travel is 3¼", maximum distance from end of spindle to table 16".

#### **Tool Room Lathes**

A new 10" swing 1" South Bend Collet Capacity Tool Room Bench Lathe, highly efficient for precision operations on small work, will be featured in Booth 336. It is a back-geared screw cutting precision lathe with the time saving features of an engine lathe, combined with the sensitivity and accuracy of a fine precision collet lathe.

It is mounted on an all steel welded bench. The high spindle speeds with smooth vibration-free operation are achieved by a direct belt drive to spindle. Spindle speeds range from 50 to 1357 r.p.m.

Headstock spindle bearings are unusually large. Spindle is finished to a smoothness of 5 micro inches. Bed lengths available are 3, 3½, and 4 ft.

A new Series "S" 16-inch Tool Room Lathe will also be shown in operation. Large diameter hand

wheels facilitate precision adjustments. Adjustable micrometer collars are large and have clear-cut graduations. Spindle speeds range from 21 to 725 r.p.m., and the direct belt drive provides smooth vibration-free operation at high speed. Available Tool Room attachments include hand wheel type draw-in collet chuck, telescopic taper attachment, micrometer carriage stop, thread dial indicator, and chip pan.



#### **Grinding Squares**

The highlight of the Super Tool Exhibit (Booth 133) will be the demonstration of a new attachment for the accurate grinding of squares, hexagons, etc., as well as the grinding of radial relief.

It is readily adjustable to required diameters, and its flexibility permits use on a wide variety of work. Any

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A Postel Filing Machine
pays for itself. Filing
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These models are made of reinforced iron frames. Sold as low as \$29.50. Equal to filing machines selling for \$50 more! Get full information. Write for a bulletin today!

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TODAY speed counts... speed that gets rush orders out on time... speed that keeps a plant operating at top efficiency.

A sure way to step up assembly output is to use Chicago Rivets and automatic multiple rivet setting machines. Set up to four rivets at a single machine stroke and set them cleanly and firmly without harming the finish. You will save money too, for Chicago PRECISION RIVETS and machines are industry's most economical combination.

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TUBULAR AND SPLIT RIVETS IN ALL RIVET METALS AUTOMATIC AND MANUAL RIVET SETTING MACHINES

1847

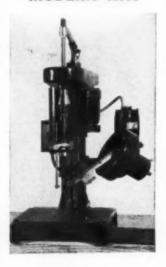
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DETROIT, MICH.

number of equal flat surfaces can be produced accurately, and the relief grinding is adjustable to requirements. A variety of Cemented Carbide Tipped Tools will also be shown.

#### Special Tools

Special Scully-Jones tools for recessing, grooving undercutting, necking and facing will be featured in Booth 142.



These tools are suitable for use on automatic screw machines, turret lathes, drill presses and horizontal boring mills. A ball bearing stop collar strikes against the work, stopping the forward movement, while the rear portion of the tool continues in motion, feeding the tool bit into the work. Adjustment is provided for the tool bit after regrinding, for location of the groove, for correct depth setting in controlling the diameter of the recess and also for length of recess or groove in tools where the bit moves forward after reaching the maximum diameter of its cut. Holes as small as 5/16" can be recessed with grooves of varying widths and depths. Also featured will be shell end mills with Stellite blades brazed in an alloy steel body. These milling cutters are designed for faster milling of cast iron and produce more pieces per grind.



#### Thompson's No. 514 Smooth-Side Grinding Wheel Dresser

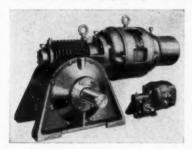
A precision cutter unit with a resilient bushing.

Patented Price complete \$1.50

Thompson Mig. Company 142 W. 12th St., Erie, Penna.

#### **Motorized Speed Reducers**

The complete Janette line of motorized speed reducers will be exhibited in Booth 378. Speed reducers range from 1/50 to 10 h.p., 0.08 to 1140 r.p.m., in 19 different styles and 43 sizes. Illustrated is the RW (right angle worm)



line of speed reducers, made in 6 sizes from  $\frac{1}{8}$  to 10 h.p., 5.9 to 431 r.p.m., with either base or flange mounting.

#### Industrial Lubrication

Various samples of munition and airplane parts machined with Stuart oil products will be displayed, at Booth 174, featuring the new developments in metal working oil products required for these items of defense production. Samples of light, medium and heavy "EP" oils and greases for machine tool applications will be available for inspection, comparison and engineering discussion. In each case the load carrying capacity of these oils and greases is claimed to be much higher than straight petroleum oils and greases of corresponding "body."





(Pronounced COLE'-MON-OY)



#### CASTINGS OF COLMONOY

We are in position to make and machine COLMONOY castings, for centerless grinder rests, saw guides, seal rings, valve seats and innumerable small parts where solid castings are desirable for parts subject to excessive wear or corrosion.

Where several duplicate parts are hand-faced at one time, COLMONOY may be cast-on. Send us your blue-prints and let us quote on your next job.

CATALOG ON REQUEST.

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Hard Surfacing, Allays and Overlay, Metals

#### Induction Heat Treating

Exhibit 202 will feature the newest Tocco Junior machine single - station 20 Kw. (output) utility unit specially designed for heat - treating small parts. Also shown for the first time will be the larger Tocco Junior machine with universal transformer panels. The small 20 Kw. Junior will be in actual operation.

The small unit comes in two models; one for applications not requiring quenching such as annealing, brazing, soldering, heating for forming, and forging; the other for localized hardening. Both styles use the same high frequency motor generator sets, supplying 9600 cycles of high frequency





#### "CHAMPION" Steel Racks

Save time, steps and money by keeping bar stock, shafting and pipe out of the way and off the floor.

Write for full details.

The Western Tool & Mfg. Co. Springfield, Ohio current at 220 volts, and both units have all required control devices. For Tocco-hardening, the 20 Kw. will be equipped with pre-set, full automatic controls and fixtures designed to meet the user's specifications.

#### Developing and Printing

A new Bruning developing machine will be featured in Booth 132, designed to be used with the "75" BW Printer. Using this new combination, one operator performs the entire printing and

#### ATTENTION - ALL WELDERS!

#### SPATTER-EX COMPOUND-

These two new metal coatings soluble in water, prevent adhesion of spatter to parts, dies, or welding holder jaws. No longer is it necessary to grind or chip weldspatter from metal surrounding the weld.

Spatter-Ex is transparent and of light jell consistancy. Is used on the part to be

#### FLASH-EX COMPOUND

welded and is effective in arc flash or butt welding.

Flash-Ex is white and pigmented. Largely used with resistance welding to prevent dies and welding holder jaws from becoming jammed with spatter, and with non-ferrous metals having greater heat conductivity than cited.

Send for more information today.

#### WAYNE CHEMICAL PRODUCTS CO.

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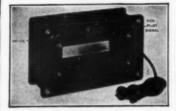


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Write today for literature about Marshalltown Presses available in capacities from 5 to 70 tons.

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Every tool room needs this simple, portable, sturdy demagnetizer. Small parts passed through the powerful AMC field are instantly demagnetized. Large, flat surfaces can be demagnetized by sliding the device over the surface.

Price is only \$32.50, complete as shown.

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### Whitney Lever Punches Pay Their Way









Because of their power, capacity, simple construction and fine balance, you will be able to do more punching. Because all main parts are drop-forgings of high grade alloy steel with wearing parts heat treated, these punches last longer.

The W. A. Whitney No. 8B Punch shown at left makes a ¼\* hole in ½\* iron. The No. 2 punches a ½\* hole in ¼\* iron. Its companion, the Channel Iron Punch—¼\* hole in ¼\* iron.

Let us send you our catalog showing the complete line.

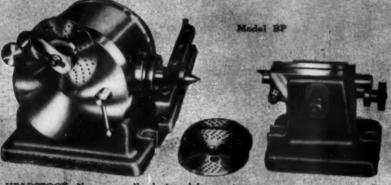
W. A. WHITNEY MFG. CO.

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# W DIVIDING HEADS

Astonishingly low priced, but high in quality, these new L-W 11<sup>n</sup> Universal Dividing heads give the utmost in accuracy at a cost lower than any similar piece of equipment on the market. Ruggedly built, constructed with many new features which increase their accuracy and their use for practical, profitable shop operation.



HEADSTOCK—New, raggedly designed for maximum rigidity. Can be swiveled to an angle.

TAILSTOCK-New design, heavier and stronger.

HEADSTOCK SPINDLE—Tapered beerings, bored for No. 10 B. & S. taper. Increased diameter and length. Threaded nose 2% diameter 10 thread USS.

WORM—Made from special alloy steel, accurately finished, end thrust taken by ball bearings. Means are provided to make adjustment of worm wheel easily and accurately.

WORM WHEEL-Large diameter, 40:1 ratio, accurately generated, securely mounted on spindle.

EQUIPMENT—% table slot tongs as, three index per as are furnished, dividing all numbers to 50, and even numbers to 100, with the exeption of 96 T. The Index chart furnished gives all divisions obtainable to 380.

MODEL BP FOR PLAIN MILLING MACHINE

\$122.50

MODEL AU-FULL UNI-VERSAL FOR COMPLETE INDEXING AND SPIRAL CUTTING

\$187.00

L-W CHUCK CO.

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# CHICAGO MOUNTED V/T SUPE

### 150% LONGER LIFE

Chicago Mounted Wheels made of the new V/T Super Bond prove by tests conducted in many plants on snagging and exacting operations to have from 150% to 300% longer life. They're tougher; can take more punishment; grind more pieces per wheel, faster and without sacrifice of cutting action.

V/T Super Bond holds its original shape longer. Wheel will not ridge A grinding welds, sharp corners, sinking dies, barbering, and other work of this character.

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### FREE MOUNTED WHEEL CHART

Ideal for ready reference in the shop. A Wall Chart 22x1ff. showing actual size and shape of every standard Chica o Mounted Wheel.

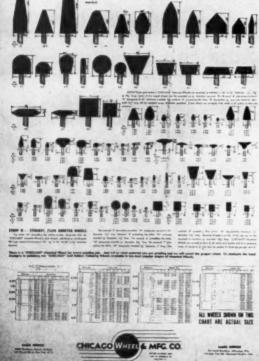
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Makers of Quality Products !

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### GREATEST FORWARD STEP IN 30 YEARS

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V/T Super Bond is one of the most important developments in mounted wheels. Wherever the use of a tough, hard bond that will stand the gaff is required, V/T Super Bond will be found without peer. Nothing can compare with it in endurance, stamina and performance. There is a shape and size to handle every grinding job faster, better and at lower cost.

### Chicago Mounted Wheels

The FIRST small abrasive wheels mounted on steel mandrels to be offered to industry.

The FIRST with this special new and exclusive bond - V/T Super Bond, unequalled in strength and long life.



### HANDEE TOOL OF 1001 USES

Here's a small "power house" that can be carried to any part of the shop and used wherever there is an electric outlet. Repairs hard-to-get-at parts on machinery without removing the part-smooths off rough spots on dies and moulds-cleans delicate mechanisms-grinds, drills, polishes, cuts, routs, carves, sands, saws, sharpens, engraves, cleans, etc. Uses 300 accessories. There are more Handees in use today than all other tools of this type combined.

De Luxe model weighs 12 oz.

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Applied to
ALL SIZES,
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Sizes up to 10 hp

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developing operation. In operating the developer, the sensitized paper and tracings are fed into the machine at the front, where they are immediately exposed in the printer section. A vacuum separator roll at the discharge point of the printer separates tracings from exposed prints, allowing the prints to pass automatically to the developing and drying sections. Tracing is returned to the operator, while the completely developed print is delivered flat and dry at rear of machine.



The Model "55" BW printer will also be exhibited. This machine is especially compact for its capacity, measuring only 32" wide, 62" long, and 48" high. This 42" printer operates with either cut sheets or roll stock. It prints ink tracings at from 12 to 15 feet per minute. Light source is a 55-watt new-type mercury vapor quartz lamp guaranteed for a life of 1000 hours.

### **Hobbing Operations**

Four applications of Barber-Colman tools, which are representative of a series of 20 different types of tools will be featured in Booth 100. Each tool exhibited will be in relation to some particular application taken from the field wherein it is in actual operation.

### For Defense Production...



### PANTO

COMBINED ENGRAVER

ELECTRIC MARKER

Compact pantographic bench-type machine, with interchangeable heads, for wide range of work. Illustration shows engraving head attached.

#### CUTTER GRINDER

Accurate inexpensive unit for sharpening single-lip engraving and routing cutters.

#### MASTER COPY TYPE

2 and 3-dimensional brass and 3-dimensional plastic, for engraving, marking, discutting.

#### CUTTERS AND ENDLESS BELTS FOR ALL TYPES OF ENGRAVING MACHINES

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Motor Driven

Timken roller or ball bearings to spindle

Write today for circulars.



Burke Machine Tool Co. 297 E. 16th St., Conneaut, Ohio Comile AVC.

Deriori Michigan

## HAND AND POWER FEED MILLING MACHINES

**V-Belt Drive** 



Write for additional information and data on these time and money-saving machines

Designed to meet the requirements of those who need a good rugged production milling machine. Has rack feed for quick operating. 3-step V pulley on motor and one on jackshaft. Reversing switch and motor are mounted in base. 12 speeds are obtainable, from 180 to 3200 RPM. Spindles are made of special spindle steel ground and fitted with Timken adjustable roller bearings.

### MILLER & CROWNINGSHIELD GREENFIELD MASSACHUSETTS



**Drop Forged Steel** 

Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 195,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

Send for our new 336 Page Catalog.

E. A. BAUMBACH MFG. CO.
1810 So. Kilbourne Ave., CHICAGO, ILL.

A photograph of the actual operation, the tool and the part it produces will be shown.



An illustration shows the operation of hobbing six taper splines on the hub of an automobile made of high-carbon molybdenum steel, on a Type T Hobbing Machine. The part is accurately hobbed in a single operation. Noteworthy is the increased use of tapered splines for parts of this kind.



Also shown is the hobbing of precision small gears for electric meters on a Type S machine with magazine

feed. The gears are 90 pitch and have 48 teeth. Outside diameter is 0.555". The cycle of the machine is entirely automatic, three machines being run by one operator. Approximately 110 seconds is required to cut each load of 20 gears. The hob is 34" in diameter by 1/2" in length. It can be reset 4 times producing a total of 102,400 brass gears per grind.



Another view shows the hobbing of automotive transmission gears on a Type V Vertical Machine, using a ground tapered hole hob. The gears are of SAE 5140 steel, have 45 teeth, 14 pitch are 3562" in diameter. The gears are hobbed with a feed of 0.073" per revolution of work, at a hob speed of 150 r.p.m. using the climb method of cutting. Floor-to-floor time for load of 6 gears is 13 minutes. Due to the use of tapered hole hobs on tapered hob spindles the run-out error averages only 0.0001" to 0.0002".

### **Precision Inspection Equipment**

Featured in the Scherr exhibit will be the new Comparitol, a precision measuring instrument developed to speed up the inspection problems of metal-working plants, small and large. It works on a new, patented knifeedge principle. The mechanism com-



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PORTABLE ELECTRIC **BLOWERS & SUCTION CLEANERS** 

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CLEMENTS MFG. CO. Chicago, Ill. 6651 S. Narragansett Ave.,

### Precision Production Milling and Boring

Jackson has designed this machine especially for High Speed Precision Production Milling and Boring. On pockets, slots,

> angles and compound angles up to 900 it is unexcelled. Working surface 8"x 24°. 4° vertical spindle travel. Rigidly con-

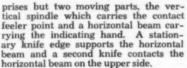
structed.

Send for complete details.

JACKSON MACHINE & TOOL CO. JACKSON. MICHIGAN







The new Ultra-Chex Inspectoset will be shown. This consists of 34 precision length standards and will produce all combinations in steps of 1/10000" from .300" to 8".

Also included will be the Wilder Micro Projector, a highly accurate machine for measuring or comparing objects by means of a magnified shadow image. The construction is such that shop officials and inspectors may group about the instrument discussing various defects and manufacturing problems revealed on the screen.

Another entirely new product is the Magni-Ray, a wide-field illuminated magnifier, for use in inspection. The magnifier comes with a stand and may be removed so

be watched while the work is in progress. There are two models, one with a highly specialized achromatic lens with a magnification field of two full



inches plus a magnification power of  $1\frac{1}{2}$ ".

The Magne-Blox, Ultra-Chex and other precision tools will be shown.



**Boice-Crane Power Tools** 

"Power Tools" is the title of an attractive catalog offered by the Boice-Crane Co., Div. C, Toledo, O. Tools presented include band saws, drill presses, jig saws, jointers, lathes, planers, shapers, and other types.

### HALCO UNIVERSAL HEAD

FOR HIGH SPEED
MILLING DAILLING BORING STANGLE

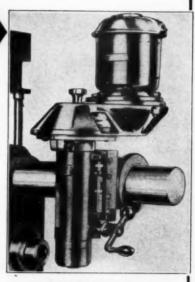
### SPEED • ACCURACY • DEPENDABILITY

The Halco Hi-Speed Universal Milling attachment is designed to meet the demand for greater efficiency, better workmanship, and for speed in building tools, dies, jigs, fixtures, wood and metal patterns, and other machine products where accurate and fast machining are of prime importance.

With its 4 inch vertical travel, many drilling, milling, boring and facing operations can be accomplished in one setup. The total weight is approximately 90 pounds, and it can be easily mounted by one man.

The Halco Head is engineered and built to precision limits in a modern shop by skilled mechanics. All parts and materials built into this machine are the very best obtainable and unconditionally guaranteed for six months.

Motor of heavy duty type, 1/3 H. P., 110 volts, 60 cycle, with plug-in cord and switch. Easily reversible for L. H. cutters. Five speeds 350 to 2900 R. P. M. Also 10 speeds 125 to 2900 R. P. M. available at extra cost.



PRICE \$195.00 In U. S. A.

With 10 Speed Back Gear \$47.50 Extra

Sold direct, factory to you, or your nearest dealer. Many machines in use. Tried and tested in machine plants for 1-1/2 years. Each head is unconditionally guaranteed for six months.

Write for folder giving details or order now for quick delivery.

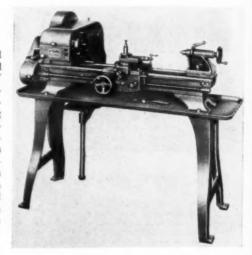
HALCO PRODUCTS CO.

14230 BIRWOOD AVE.,

DETROIT, MICHIGAN

#### A New 10" Lathe

Featured in Booth 120 will be a new Logan back geared metal-cutting lathe of 10" swing with 24" between centers. This lathe has a precision pre-loaded ball bearing headstock, power longitudinal and cross feeds, prismatic V and flat ways and is equipped with unit countershaft assembly. Threads from 4 to 216 per inch can be cut on this new unit and it should be a useful addition to any Tool Room or Machine Shop.



### ABRASIVE CUTTER



Designed for tool rooms. Can be utilized for light production. Two convenient sizes for mounting on bench. Legs supplied at an extra cost. An inexpensive cutter costing only

### \$140.00

Does quick and accurate cutting at minimum cost. No job too hard for Grit-Cut. For quick repairs the cartridge type apindle can be re-

the cartridge type spindle can be removed and assembled spindle substituted.

The No. 6 machine capacity is 1° solid or 114° tubing. Size of wheel is 6°. Motor is 34 h.p., 3450 R.P. M. Spindle speed 10,000.

Let us send you complete details.

WILLIAM BOUGHTER
Whitehall Rd. near Township Line, Norristowa, Pa.

LUMA
Combination
Etchtool —
——3 —
Tools
in 1

Luma Marking and
Demagnetizing SiMULTANEOUSLY

Writes on hardened steel — demagnetizes at the same time—with carbon point does light spot annealing and soldering jobs. Compact easy to use—dependable.

Send for details-5-day FREE TRIAL OFFER!

Luma Electric Equipment Co. Dept. H-Main P. O. Box 132, Teledo, Ohio



Can you afford to be without this R and L Turning Tool? It does the work of 14 separate tools, costing 4 times as much—that's enough to warrant its use in your plant.

Besides R and L has features that give added speed — added accuracy—and added efficiency to your operations. May be used for turning multiple diameters, for drilling and turning, for pointing, centering, burnishing, etc. Tantalum carbide backrest burnishes while turning.

Five sizes of R and L enable you to increase the efficiency and productiveness of your lathes and screw machines on a wide variety of work.

Inquire about our Tap and Die Holder, Roller Backrest, and Universal Tool Post. All of these tools are noted for their economy and efficiency. Anxious to save? Then don't fail to inspect this Turning Tool. Learn how easy it is to save money, time and tools.

Save over \$200 on initial cost alone. For \$65.00 you get this R & L Turning Tool-less than one-fourth the cost of tools capable of doing the same jobs. And, because they are simply and ruggedly built, they retain accuracy, thereby saving maintenance costs.

Save time too, by reducing set-up periods—speeding up cutting—doing right and left hand turning—or performing several operations simultaneously. In ten seconds, can be changed from a Right to a Left Hand Turning Tool.

Save on tools by using this R and L that does the work of 14 separate tools. Do away with reconditioning of extra tools when worn, or replacing when lost.

Please send for our newest booklet describing the money-saving line of R and L Tools.



### R and L Tools

1827 Bristol Street.

Nicetown, Philadelphia, Pa.

### **NEW GS Dial Test Indicator**

### with UNIVERSAL BALL JOINT BACK

The universal ball joint makes it easy to set the indicator in practically any position on the machine and enables you to reach work that may be inaccessible with ordinary indicators.

The GS Dial Test Indicator comes with clamp, internal attachment, toolpost holder, etc. Simple mechanism guarantees accuracy, longer wear, minimum of repairs. Write today for folder H-250 giving full details and prices.

#### ON DISPLAY IN DETROIT MARCH 25th TO 29th

Be sure to visit Booth 241 to see our exhibit featuring the WILDER MICRO-PROJECTOR, the new COMPAR-ITOL measuring instrument, REED Micrometers, the GS DIAL TEST INDICATORS and other precision tools.



GEORGE SCHERR CO., NEW YORK, N. Y.

#### **Industrial Lubricants and Products**

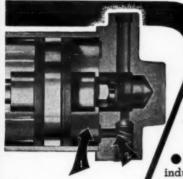
Houghton will exhibit in Booth 116 various industrial lubricants and products used in manufacturing operations, including carburizing, heattreating, thread cutting, etc. Comparative examples will be shown of work done with Cut-Wax No. 7305 cut back with two parts of light mineral oil to one of the No. 7305 and run on a Landis pipe threading machine.

Liquid Carburizing Bath for Hu ds on transmission gears as illustrated, will be shown, using Perliton Liquid Heat in an Ajax furnace. Gears are suspended on racks installed in the furnace. The gears are forged from SAE 4640, treated in Perliton at 1500° F., for 1½ hours, oil quenched and drawn at 400° F. Case depth—012″—016″. Hardness C-57—C-60.



Carburizing transmission gears which are suspended on racks installed in the furnace.

# NOPAK Self-Regulating



CUSHIONED IR CYLINDERS **Meet Most Operating** 

Requirements

Provide desirable features of Constant Cushioning with Smooth Gradual Action.

1. Built-in, Self-Regulating Air Cushion.

Z. Ouick-opening Air Duct assures quick starting under full power.

Since their introduction late in 1939. industry has found more uses for the new NOPAK Air Cylinders with Self-Regulating Air Cushion than for the two earlier types combined. Here are a few reasons why: 1. The smooth, gradual, predetermined cushioning action remains

constant. 2. There is no needle valve to be frequently re-adjusted, clogup, or get out of order. 3. Eliminate damaging metal-to-metal impact, noise, shock and vibration. 4. They place Cushioned Air Cylinders in the non-cushioned price range. 5. Prolong cylinder life-cut maintenance costs way down. You, too, may find that this new type cylinder will fulfill most of your needs.

GALLAND-HENNING MFG. CO. 2754 S. 31st Street · Milwaukee, Wisconsin

Consider All 3 Types - they're fully described and illustrated in Bulletin 77. If you haven't a copy, send for it.

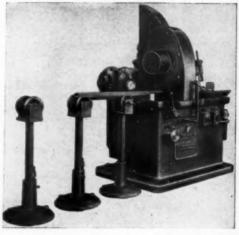
VALVES and CYLINDERS

SIGNED for AIR or HYDRAULIC SERVICE

#### A New Cut-Off Machine

Featured in Booth 205 will the "Cutamatic" Wet Abrasive Cut-Off Machine, It maintains an oscillating movement across the surface of the cut, to keep arc of contact practically uniform from start to finish. As a result, it is claimed there is no heat problem at the center of a cut in passing a wheel through a 6" solid bar. Burning, surface hardening and glazing are said to be eliminated and there is little or no burr on the edges of the cut.

The No. 250 Nibbling Machine will also be shown. It cuts up to ½" thick mild steel and 3/16" thick stainless steel up to 70" widths. The throat depth of the unit is 36". Stroke is adjustable so that it can be regulated to the thickness of the metal being cut.



Standard speeds are 350, 500 and 800 r.p.m.

### Hy-Duty Shape-Rite Shaper



8" Stroke Floor and Bench models with anti-friction bearings and helical gears throughout with balanced Bull Gear and Rocker Arm.

Sales Service & Mfg. Co.

Available in Moiselesser types and Vibratics and Hammer types and Vertical and Horizontal Multiple Spindle Spinning Machines.

You're invited to send unriveted samples and recommendations and recommendations and recommendations.

THE GRANT MEG.

A MACHINE CO.

BRIDGEPORT, CONM.



ATLAS PRESS COMPANY

350 N. Pitcher St., Kalamazoo, Mich. NEW YORK CHICAGO PHILADELPHIA 130 W. 42nd St. 35 E. Wacker at 113 N. Third St.

QUALITY SHOP EQUIPMENT SINCE 1911

and tap.

ping up to

2.3, and 4 spindies \$195, 3310,
3350 less motors

(1/3 or 1/2 HP).

### Surface Grinding-Contouring

Display No. 358 will stress the importance of Continental equipment in the present preparedness program. Featured among several machines on exhibition will be a new Doall Production Surface Grinder. It is designed for the rapid surfacing to extreme tolerances of production parts. It has a table capacity of 9 x 18" and is built either for wet or dry grinding. The illustration shows the machine with the coolant attachment. It is claimed that absolute control is maintained in the vertical feed of 0.001" and 0.0001", the hydraulic traverse feed of 0-50 F.P.M. infinite and also infinite cross movement of 0-.125"

At least two models of contour metal shaping machines will be displayed. These machine tools are built for continuous sawing, filing and polishing.

Used on these machines are narrow blade precision band saws, also made by an affiliated company. These are avail-

able in widths from 1/16" to 1" and in a wide range of specifications to meet the demands of any material being cut.

Tool Steel Chart

A handy wall chart is announced by the Jessop Steel Co. Types of tool steels are recommended for 164 different applications, ranging from bull-



dozer tools to thread chasers. On many items, recommendations are given for ordinary use and for longest runs.

A valuable portion of the chart is that devoted to recommended heat treatment for different brands of Jessop steel. Detailed specifications are laid down for hardening, type of quench, tempering, annealing, and forging. Both general and specific precautions are outlined.



### Mill Over 1,000 Parts Per Hour

WITH THE

NEW Dearborn Automatic Chucking and Indexing Fixture

Work held by draw in collets. Collets open and close automatically. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces. Minimum set-up time required. Speeds up production. Positive and accurate in operation.

J. W. DEARBORN

72 S. CLIFF ST.

ANSONIA, CONN.

# Extra CANEDY-OTTO



### 6 Spindle Drilling Unit

Meet the increasing production schedules with this time saving precision drilling unit. Designed and engineered to do the greatest amount of work in the least possible time.

Full ball and roller bearing. Each head individually driven and controlled, with a separate geared power feed and eight spindle speeds—four hy means of open belt and four through back gear concealed in spindle column. Eight-step sheave type pulleys are available, giving 16 spindle speeds. The base contains oil sump for wet drilling.

Feeds are .003, 005, .007 and .010. Taper hole in spindle, No. 4 Morse.

Capacity with back gear is 11/2" in cast iron. Without back gear, 1". Spindle



travel with power feed is 9¼. Smallest distance between spindle and gib is 10½. Working surface of table is 24.x119. Maximum distance between spindle and table is 22. Vertical travel of table is 11. Distance between centers is 19. Total height with spindle up to 104. Height of base 10. Overall dimensions of base are 54. x135. Net weight is 12,000 lbs. It will pay you to investigate this efficient, modern unit today.

# CANEDY-OTTO MFG. CO. CHICAGO HEIGHTS, ILLINOIS



### PRODUCTION MINDED EXECUTIVES TURN TO "SHIFTWEIGHT" WIRE REELS!

TO SAVE MAN HOURS!
TO AVOID SHUTDOWNS!
TO SPEED PRODUCTION!
WHEREVER WIRE IS HANDLED FROM REELS "SHIFTWEIGHTS"

CAN DO THE JOB-BETTER!

ONE MAN LOADING "300 POUND CAPACITY "SNARLPROOF NO BOLITING TO FLOOR "WELDED STEEL CONSTRUCTION FULL ADJUSTMENTS

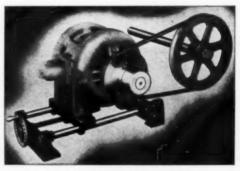
WRITE FOR COMPLETE INFORMATION MOSLO MACHINERY INCORPORATED 5005 EUCLID AVENUE CLEVELAND, OHIO

DEALERS' INQUIRIES INVITED

### Variable Speed Drives

The Reeves Vari-Speed Jr. is presented in Booth 122, an addition to a broad line of variable speed control equipment. Speed variation is "infinite" within the limits of the unit, and is accomplished while the machine is running. The unit is built in six different sizes of disc assembly, for use with motors of from 1/8 to 11/2 h.p. and provides speed control over a range of from 1-34:1 to 2-34:1, inclusive, depending upon the size, power and speed of unit selected. It is also available in a countershaft

Also exhibited will be a new, improved type of handwheel-speed indicator for use with the Variable Speed Transmission, Vari-Speed Motor Pulley and Motodrive.



### **Shepard Niles Hoists**

A handsome 48-page catalog is an-& Handsonie 10-page catalog is and nounced by the Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y. Their extensive line of electric hoists is described clearly and in great detail.



### ON REPEAT OPERATIONS WITH COLWELL TOOL POST TURRETS

This modern method of increasing production and profits is available for 9" to 20" lathes and there's a new "Midget" size for smaller lathes. Can also be furnished for turret lathes. Four positions are provided. Operation is speedy, simple, accurate and dependable.

May we send bulletin giving full details?

S. G. COLWELL, 25 Congress Ave., Providence, R. I.

### Janette Speed Reducers

FOR YOUR SLOW SPEED MACHINE TOOL DRIVES 1/50 to 10 H.P. .08 to 1140 R.P.M.



See our speed reducers at the A.S.T.E., booth 378, Machine & Tool Progress Exhibition at Detroit, Mich., March 24-29.

SEND FOR OUR 100-PAGE CATALOG

This company is operated by the original founders. We are small enough to be flexible without red tape and to take a personal interest in every customer; but large enough to have an established, international reputation for building only high quality, reliable machines, which are sold by our world wide sales organization.

Janette is one of the very few companies who build BOTH motors and gear boxes. Janette motors are designed especially for use with speed reducers. All machines are built complete in our own factory, by our own organization. There is no divided responsibility for the performance of the gear box or motor.

Janette Manufacturing Company 558 West Monroe Street Chicago

SPOT OYER

WELDER

Floor Models 10-35 KVA Bench Models 2½-10 KVA 220-440 Volts

MAXIMUM PRODUCTION SIMPLICITY OF OPERATION POWER ECONOMY

Standard and Underwriters
Labeled Machines

Write TODAY For Literature



Only Manufacturers of the Dyer Welder

The Topeka Foundry Iron Works Co.

INC

300-322 Jackson Street

Topeka, Kansas

The many types offered include general utility hoists, close clearance hoists, cab operated hoists.

hook suspension, base mounted, and cab operated hoists.

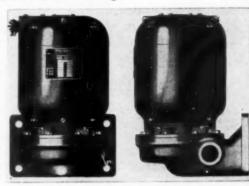
#### A New Coolant Pump

A new Pioneer Coolant Pump, Model "VBA," will be featured in Booth 239. It is distinguished by its compactness.

This new model is described as capable of functioning efficiently with an extremely low water level, particularly in shallow places. Positive prime is said to be assured even with the reduced height of colorie in the supply to the said to be assured for the said t

coolant in the supply tank. The Model "VBA" can be readily taken apart and serviced. The motors have be en modernized by streamlining. The same improved motor design is

now carried throughout the entire line of Pioneer Pumps.



A Belting Development

Octopus Flat Transmission Belting is announced by the Manheim Mfg. & Belting Co., Manheim, Pa.

Identified by a distinctive green color, Octopus flat belting is said to combine a remarkably high degree of resilience with very strong pulley grip. This belting runs at low tension, reducing bearing wear. Octopus requires no belt dressing and is not recommended for oily drives.

### DIE ACCURACY without DIES



For small quantities you can shear stock sheets to size and trim metal stampings with the

Micro BENCH SHEAR
Does fast work, accurate to
.001°. Shearing width 61/4°.
Circular free, also shows
Micro Bench Bender and
Brake.

O'NEIL-IRWIN MFG. CO. 314 8th Ave. So., Minneapolis, Minn.

### **Face Mill Grinding Attachment**

A new Covel Face Mill Grinding Attachment of the larger capacity is announced.

#### NO BELT SLIPS WITH VACUUM CUP C. I. PULLEYS



Shut Off Expense Caused by Slippage You Save Money on Every Installation

NEW LOW PRICED PRODUCTION LINE SOME OF SIZES Send for List—On the Shelf

Dia. Face Price Dia. Face Price 2 "x22 " - 81 25 4 "x3 : " - 82 85 2 5 2 2 x22 " - 14 5 4 1 25 7 4 2 8 5 8 3 2 3 5 5 6 2 5 7 4 1 7 5 7 4 7 5

Increase your Production

We supply Fractional Dia, and Face Palleys—From large casting stack.

VACUUM CUP METAL PULLEY CO., INC.,

12535 Grand River Ave.,

Detroit, Mich.,

# **SAFETY PLUS** - efficiency and accuracy!

Here is a grinder that can be used by even the most inexperienced operator with a minimum of risk. From the patented Twin-Lite aafety shields to the rugged and machined tool rest every item of design and construction has been developed to give maximum safety, efficiency and accuracy.

New standards have been set by these grinders. Wheels are balanced to within 1/100 inch connec to insure vibrationless performance. The new Twin-Lite Safety Shields and lamp attachments flood the wheels and work from both sides, permitting much more accurate grinding and making the grinder independent of the shop lighting system. Quickly replaceable balbs (two in each shield) are thoroughly ventilated and fitted with polished reflectors. Ball bearings are lubricated for their entire life . . . accurate tool supports . . . strong and adjustable spark guards . . . these are only some of the features found in these remarkable grinders.

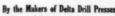


To test the strength and completeness of the guarding of these grinders, a number of wheels were deliberately smashed with a rifle bullet while the grinder was running at speeds from 3400 to 8000 R. P. M. The spark guard was alighily beat, and that was all. That's asfety plus!



### Also Bench and Belt Driven Models

Built in both single phase and three phase models, beach and pedestal types, motor and belidriven there is a Delta grinder to fit every shop.



Advanced design and moders produced in methods have won world-wide acceptance of Delta single and multi-spindle drill presses. Delta grinders are designed by the same engineers — and made by the same methods that have made possible mew standards in machine too! values!



Send coupon below for Special Grinder Bulletin giving full details and specifications on the complete line of Delta grinders. Send for the latest Delta Catalog.

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The	E	4	1	1	MFG.

INDUSTRIAL BIVISION:

Gil E. Vienna Ave., Milwaukee, Wis

The	Delta	Mig.	Co.,	(Industrial	Division
				Milwaukee	

Gentlemen: Please send me your special Grinder Bulletin giving full details and specifications on the complete line of Delta Grinders. / / Also send latest Delta Catalog of Industrial power tools.

Name .....

Address

City

State

It is used for all kinds of grinding work on a Universal cutter and tool grinder, especially for grinding milling cutters and taper reamers. Spindle swivels in both directions 360° and is securely locked. Spindle is mounted in adjustable precision ball bearings which eliminate end and side play but still permit free turning.

mounted on any grinder having a flat top table from 4-1/2" to 6" wide.



A No. 7 Morse taper hole is provided in the spindle. Distance from the base to the center of the spindle is  $6-\frac{3}{4}$ ". Size of Base,  $5-\frac{1}{4}$ " x  $7-\frac{1}{2}$ ". Net weight 90 lbs.

### Special Anti-Mushrooming Anti-Chipping Heat-treat Oversize Shanks Exclusive Knurled Back > Exclusive Thumb Grip Broach-Rounded > and Corners complete line of Marking Devices Write for Price and data Bulletin No. 113-12A NEW METHOD STEEL STAMPS, Inc. 149 Joseph Campau, Detroit

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. - Inexpensive last for years.

Write for Circular NIELSEN TOOL & 1859 Gardner Ave. Berkley, Mich.

SUPERIOR QUALITY AND WORKMANSHIP PLUNKET VISES



The Shaper Vise has graduated base and tongue in center to fit slot in table, and has holes for bolting down. In ordering this vise give size of slots in Shaper Table, also distance from center to center of slots.

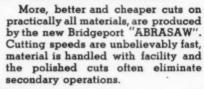
...\$46.80 Milling Machines, Shapers and Grinders.

Prices are net, f. a. b. Chicago. Write for illustrated folder today. Dealers wanted in unoccupied territory.

SQUARE BASE SHAPER VISE J. E. Plunket Machine Co. 1822 W. Lake Street

### "ABRASAW"

### BRIDGEPORT No. 47W Wet Cut-Off Machine



Capacity 2<sup>n</sup> in tubing, 1<sup>n</sup> in solid bars. Our model 48-W handles  $3^{\frac{1}{2}}$  tubing,  $2^{\frac{1}{2}}$  solid bars.

Let us send bulletin giving full details.

Bridgeport Safety Emery Wheel Co., Inc. BRIDGEPORT. CONN.

# THE REID POWER-FEED SURFACE GRINDER INCORPORATES SEVERAL EXCLUSIVE FEATURES,

### Including:

- 1. Centralized Control.
- 2. Convenient Cross Feed Knock-Off.
- 3. Rapid Table Travel With Chain Drive.
- 4. Complete Dust Protection.
- 5. Improved Spindle Assembly.
- 6. Hydraulic Controlled Reverse Clutch.

Send For Circular

### H. LEACH MACHINERY CO.

387 Charles St.,

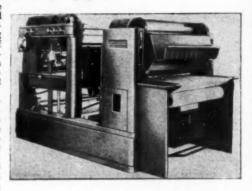
Providence, R. I.

Exclusive Selling Agents
Distributors in all leading Cities
See display at the ASTE Show



#### **Blueprinting Equipment**

The latest addition to the Pease line will be featured in Booth 180-the Model 22-16 Continuous Blueprinting Equipment. This consists of the Model 22 Printer operating in conjunction with a Model 16 Washing and Drying machine. The Model 22 features a sliding contact which smoothes out inequalities in tracings and gives 24-34" of uninterrupted exposure area. A 3-speed lamp control allows the lamps to be operated on 10, 20 or 30 amperes as desired. tinie Arc lamps burn for 45 minutes without interruption and resume instantaneously.



The Washer and Dryer includes a horizontal water wash that floats the paper horizontally, free from tension and wrinkles. It also includes a quick change chemical applicator, which gives a changeover from blue prints to negatives or vice-versa, in 30 seconds, and applies potash to one side and hypo to both sides of the paper. Five 8" aluminum drying pans, heated by either gas or electricity provide gradual drying.

### HYBCO TAP GRINDERS

For Sharpening



A complete tap grinder for sharpening chamfer -flutes-special points. Available in two sizes of three Models-No. 2 -to %\* No. 4-to 1\* Bench - Floor - Floor with Exhaust System.

Will more than pay for themselves in Tap cost and correction of production tapping difficulties.

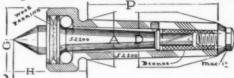
Used by leading Aviation — Machine Tool — Automotive — Parts — Manufacturers.

Visit us at Booth 216 at ASTE Detroit Exhibition

Write for Bulletin H.
Henry P. Boggis
& Company
218 St. Clair Ave., N.W.
CLEVELAND, OHIO



# A Good Rigid Live Center will increase the cost of your Lathe about 1%; and its value 10%.



... "Manufacturing for 30 years without knowing that we needed live centers, until we saw the Rigid. Now we have 10 in use."

"No sir, I never saw a Live Center that would work" said a lathe manufacturer at the Cleveland show in 1935. Now he has sold hundreds on his lathes. They sell the lathes.

The perfection of the Rigid Live Center has led to its extension to many other fields.

Aeronautical Products Corporation of Detroit says "We have used Rigid Live Centers exclusively, for years, and have never seen one of them overloaded. While the same work from a dead center would have melted it."

Not one dollar ever lost on a purchase order.

RIGID TOOL CO., 2000 Witherell St., Detroit, Michigan

### Arter Rotary Surface Grinders



MODEL A

Arter Model A Rotary Surface Grinders are mechanically operated and are built in light and heavy series. Model A-1 machines, constantly improved, have been a standard product for nearly 25 years for tool room or light production work.

Model A-3 machines, of heavier proportions, have been progressively developed over a period of years to meet the modern demands for close limit work on volume production. Model A-1 machines, are offered in 8° and 12° sizes, A-3 machines in 12° and 16° sizes. For grinding larger diameters Arter offers Model B machines. These are hydraulically operated and made in diametrical capacities of 20°-24°-30°-40°.

ARTER GRINDING MACHINE CO.

### AN INEXPENSIVE ABRASIVE BAND GRINDER



### "Built Like A Machine Tool"

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on belt. Ball bearing throughout, equipped with Alemite lubrication, complete with grease gun.

Write for illustrated folder on this and other styles and sizes.

### WALLS SALES CORP.

96 Warren St., New York, N. Y.

#### **Drafting Room Needs**

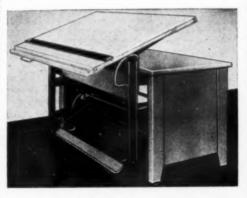
The Hamilton Auto-Shift table and Calumet Tracing Lifter File will be shown in use in Booth 141. The Drawing Table gets its name from its easy adjustability. To raise or lower the drawing surface, it is necessary to step on a pedal which releases a brake on the top. Then the top can be raised, lowered or tilted with the finger tips to any desired height.

to any desired height.

The Lifter File is part of the complete Filing system, a system of steel filing units that can be combined to meet any filing need in the drafting room. The tracing lifter is built into units which have 10 shallow drawers. These drawers are only 1" high and 100 tracings can be filed per drawer.

Hydraulic Equipment

Featured for the first time in Booth 178 will be eight entirely new Vickers



products, including Motorpump Units, a new series of Solenoid Operated Valves, Pressure Switches, Automatic Hydraulic Press Control, Rotary Piston Type Variable Displacement Fluid Mo-



### GOOD NEWS!

Transfer Points Eliminate Guesswork in Die Making

as markers in setting dies. Points are of uniform height above hex hase. Six accurately made and hardened screws nest in a special holder with hex wrench tip. Made in ½ to 1 diameters. 3/16° 81.50 per set 5/16° 81.25 per set 7/16° 81.40 per set 1/4° 1.20° 1/2° 1.50° st.

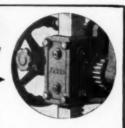
HEIMANN MFG. CO.,

**URBANA, OHIO** 

# FAMCO ARBOR PRESSES ARE DIFFERENT

#### AN EXCLUSIVE FAMCO FEATURE

Front and side gib adjustments on all Famco Arbor Presses for perfect Ram alignment.





Hundreds of operations now being performed by hand or makeshift methods can be handled better, quicker, easier and cheaper with a FAMCO foot or arbor press. 40 styles and sizes, both floor and bench models, are built to accommodate a wide range of work.

Write for literature and prices.



FAMCO MACHINE CO.

1320 18th St.,

--

RACINE, WISCONSIN

## Off Hand Grinding and Snagging



MARSCHKE Pedestal, Stand and Swing Frame Grinders give the smooth true wheel rotation essential for greatest cutting wheel efficiency and economy. Massive steel spindles. Oversize bases. Ample power. Bearing housings exclude grit, prolong life. 18 important features. Write for Catalog to VONNEGUT MOULDER CORP., 1805 Madison Ave., Indianapolis, Ind.

Above: A, C. Multiple-Speed, 25 HP Marschke. THE MARSCHKE LINE

tors. Vickers Hydraulic Variable Delivery Rotary Piston Pumps, Hydraulic Variable Speed Transmissions, Two Way Traverse & Feed Control Panel and Automatic Hydraulic Machine Control.

The Vickers Motorpumps shown, are available with both single and double end motors, and with single or multiple p u m p mountings in sizes ranging from 34 to 150 h. p. They are com-plete units. The only plete units. mounting provision required is for motor feet.

The solenoids on the solenoid operated valves are protected by rugged aluminum covers. Three general types are produced, standard thread-

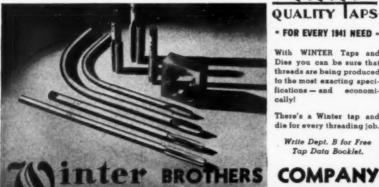
ed pipe connection models, flange pipe connection models, and the gasket mounted design. Sizes range from 1/4" to 3" standard pipe sizes.

The Pressure Switch for oil hydraulic machinery is for operating pressures up to 3000 lbs. per sq. inch. It may be used with oils of various viscosities. An automatic pressure



surge damping feature is incorporated to eliminate chattering. Generally used for the control of Vickers Solenoid Operated Directional Control Valves, the

### WINTER TAPS-DIES



- FOR EVERY 1941 NEED -

With WINTER Taps and Dies you can be sure that threads are being produced to the most exacting specifications - and economically

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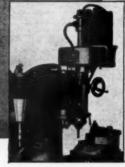
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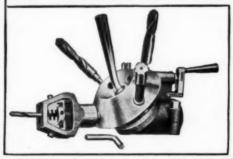
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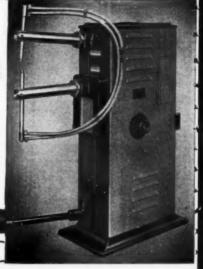
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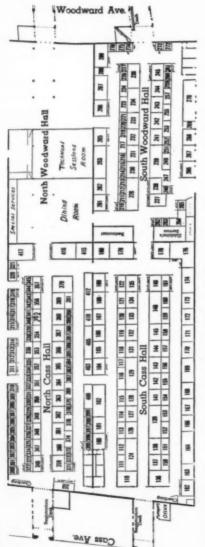
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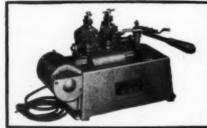
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Propeller and Propeller parts United Aircraft Corp., East Hartford Propeller and Propeller Parts Univertical Machine Co., Bench Type Vertical Mill Vickers, Inc., Detroit, Mich. Hydraulic Power Transmission Vinco Corp., Detroit, Mich.	Booth 245
Univertical Machine Co., Detroit	Booth 390
Vickers, Inc., Detroit, Mich.	Booth 178
Vinco Corp., Detroit, Mich.	Booth 242
Gages, Master Gears, Index Plan	tes, etc.

Schrader's Son, A., Brookiyn, N. Y. Booth 252



111

How many drills are being broken because your drill bushings are off center? Do you know that it is next to impossible to drill a .025 drill bushing concentric?

ALCO Tap and Drill Chucks REQUIRE NO BUSHINGS. Absolute concentricity, such as can't be had with the most accurately made bushings, is positively insured.

Equip your screw machines with ALCO TOOLS and eliminate your broken drills expense.

Write for illustrated catalog and price list.



DESPATCH HEAT TREATING FURNACES have proven their value in countless different defense production problems. New Despatch features assure straight line control-work chamber uni-

formity-flexibility. They also speed up production and cut operating costs on every ferrous and non-ferrous heat treating or solution heat treating job in the range 275°F-1200°F.



Write today for Bulletin No. 81C

## NEU-I-ROL MAGNETIC CHUCK CONTROL

#### Quick. Time and Money-Saving Way of -

- -releasing work piece from the chuck-
- demagnetizing the work when releasing it.

With NEU-T-ROL when grinding is finished just turn "OFF"-pick up work in a few seconds-SIMPLE AS THAT. No "Pull and Slide-Hammer and Pry".

NEU-T-ROL speeds production-and eliminates waste time . . needless damage to chuck . . injury to operator, when installed on grinders at work, or SPEC-IFIED on new grinders. NEU-T-ROL for every size of chuck.



NEU-T-ROL Motor-Controlled Unitfor Remote Control, if desired.

NEW BULLETIN NO. 21-gives clear, quick, money-saving information.

#### ELECTRO-MATIC PRODUCTS CO.

Also Makers of Rectifiers 4824 N. KOLMAR AVE.. CHICAGO, ILLINOIS Cutting Tools, End Mills, Form Tools, etc. Western Mig. Co., Detroit, Mich. Booth 251

Western Mig. Co., Detroit, Mich.
Machine tool drives—Multi-motor mounts
Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.
Welding Motors, Controls, Gearmotors
Westmore Reamer Co., Milwaukee Booth 39
Special Reamers and Boring Bars
Williams & Co., I. H., New York Booth 38:
Drop-Forgings and Drop-Forged tools
Wilsen Reamers Co. Section 18:
Drop-Forgings and Drop-Forged tools Booth 179 Booth 398

Booth 382 Drop-Forgings and Drop-Forges Wilson Mechanical Instrument Co, Inc., Booth 211

Rockwell Hardness Testers, etc.

Ziegler Tool Co., W. M., Detroit

Ziegler Floating Tool Holders Booth 210

Since release of this list, we are informed that Wyzenbeek & Staff, Inc., Chicago Dial Indicator Co., and Universal Machine Co., will exhibit.

#### Thor Portable Tools

In Space Number 273, the Independent Pneumatic Tool Co., will display its complete line of Thor portable electric tools. Featured will be the new Pix-Up Finder and Adjusto-Tray.-devices which sort, pick up and hold screws for driving, eliminating much hand handling in screw driving assembly operations. Demonstrations reproducing as nearly as possible actual shop conditions, will be held continuously.



Also operating, will be other tools such as drills, nut setters, grinders, sanders, polishers, saws and a new sheet metal cutting tool known as the Thor Portable Nibbler.



## Knurling . . .

### MAKES THE DIFFERENCE



Reg. U. S. Pat. Off.

#### SOCKET HEAD CAP SCREWS

Fingers gear right to the knurling—turn the Screw faster and farther before applying the wrench. And compared with your fingers a wrench is both clumsy and awkward—that's why mechanics and production men prefer the "Unbrako".

Production rushed?—then you'll find this famous "Unbrako" feature—AT NO EXTRA COST—a real advantage.

#### STANDARD PRESSED STEEL CO.

JERKINTOWN, PERNA. DEX BES

BOSTON - DETROIT - INDIANAPOLIS - CNICAGO - ST. LOUIS - SAN FRANCISCO

#### HOW DO YOU SPEND YOUR TIME?

Sharpening Cutting-off Blades? Or Operating the Machine?

Non-productive screw machine time is expensive. "Keep 'em rolling" by using Luers Patented Cutting-off Tool.

This tool turns out more work, at lower cost, because it eliminates the three chief cause of all cutting-off trouble—insufficient side clearance, insufficient back clearance, restricted chip expansion.

The T-shaped blade prevents excessive side friction—

The taper guarantees adequate back clearance throughout the blade.

The concave top curls the chip, which is free to expand without binding.

You get greater production with much fewer blades—plus a finer, sircraft finish. You save grinding time, for the blade requires grinding on the front face only. You save time in removing, inserting and resetting blades.

If cutting-off is a bottleneck with you, write us today. Holders are available for all types of hand and automatic screw machines.



Tell us the make and model of your equipment. We'll send you the information you need to cut costs and speed up production.

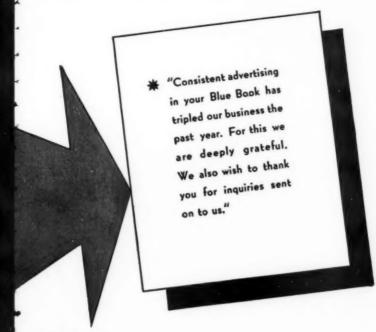
EMPIRE TOOL CO. BETROIT, MICHIGAN



BUSINESS

This led in ONE YEAR





\* Name and product on request

# An Unsolicited Letter From A BLUE BOOK ADVERTISER

Over 30,000 monthly guaranteed circulation, reaching key executives with authority to purchase your product. More than 120,000 readers per issue, (based on a recent survey). High grade, informative editorial content.

These features make the BLUE BOOK hard to beat for those who are desiring results in this vital industry.

For low rates and more information regarding this publication, write to the Hitchcock Publishing Company, 506 South Dearborn Street, Chicago, Illinois.



2000 DUCCULIETD

Taps - Dies - Gages - Twist Drills - Reamers - Screw Plates - Pipe Tools

## What's New in the Industry

#### A Large Doall Contour Machine

A NEW contour machine is announced which is designed expressly to meet the demands of defense industries. This is the "V-60" model as shown.

It features a five foot throat depth which pro-vides capacity for the handling of unusually large machining jobs. The actual diameter of any work being cut on this machine can be 10 feet. This factor has been noted with a considerable amount of interest by shipbuilding companies, tank manufacturers aircraft builders where the machining of many of their large templates or irregular shapes has often been a problem.

Thicknesses of work up to 12" can be cut, and this cutting can be done with considerable speed and precision since the machine

cision, since the machine uses narrow band precision saw blades varying from h" to 1" in width. Standard equipment on this model also includes a super butt welder which is said to join the 1" wide saw blades just as readily as the extremely narrow blades are welded.

There are two large 30" square work tables. When small work is being handled, a hand screw feed which locks for quick adjustment is used in place of the automatic power feed. An illuminated magnifying attachment is provided for use when intricate layout lines are to be sawed.



Although massive in size and engineered to provide great strength and power, this machine is said to provide the flexibility and extreme accuracy needed for sawing or filing of parts to close tolerances. The hydraulic contour feed control used in connection with the power feed provides easy operation. The V-60 has Speedmaster variable drive, affording every speed from 50 to 1500 feet per minute, thus suiting the exact cutting speed to the particular material being handed.

The "job selector," mounted on the machine, makes accurate recommendations for cutting speeds, and the saws or files to be used for a wide range of materials. This machine already is being used in shipyards, arsenals and aircraft plants.

#### A New Inclinable Press

A new No. 10 Press with gearing and other working parts inclosed is another recent development. It is a general purpose machine with strokes ranging from 8 to 12" and a bed area of 35" F to B 53" L to R. A hammer



forged crankshaft, made of a special grade of steel, coupled with a large area flanged slide are featured. A high grade semi-steel frame is employed.

Thor High Frequency Tools

Nineteen new models of high frequency electric tools are shown in the new Thor High Frequency Electric Tool Catalog, 1941 edition, now ready for distribution, announces the Independent Pneumatic Tool Co., 612 W. Jackson Blvd., Chicago, Ill.

These new models consist of:—balancers, drills, grinders, nut setters, the "Pix - Up" finder, polishers, rubbers,

sanders and screw drivers.

Considerably larger than the previous edition, the No. 61 contains a complete section of balancers and is fully illustrated by tool and action pictures, together with full specifications on all High Frequency Electric Tools.

#### Cabinet Base Knife Grinder

A type "NT" cabinet base knife grinder is announced. This new "super duty" machine is said to be capable of heavy cuts where required, at the same time maintaining precision accuracy and providing a fine finish under continuous operation.

Four standard sizes are available:—70", 90", 110", and 132". Larger sizes

may be had on special order.

The knife bar is said to be ruggedly designed. It features two work surfaces—one for shear and other heavy blades and the other for thin blades.

The segmental grinding wheel is 14" in diameter, with 16" size offered on special order. The wheel mounts eight segments 4" by 4" adjustable for wear. Standard equipment includes a self-contained water supply system consisting of tank centrifugal pump, piping, and splash pans.

An unusual feature of the "NT" cabinet base knife grinder is the special platen available for sizing light armor plate 1" thick, 36" wide, and 100" long.



The table and knife bar are driven by steel rack and pinion at speed of 28' per minute. Hydraulic table traverse is available if desired.

## PREPARE Today



#### TOMORROW'S PROTECTION

The No. 411 wide vision type goggle is ideal for either indoor or outdoor use. Provides high efficiency in sight range with unusual allowance for ventilation through rubber bound aluminum frame. Equipped with adjustable nose strap and wide elastic head band. Can be equipped with any type of lens.

Virite on your letterhead for a pair of these goggles for test purposes and a catalog showing our complete line.

SELLSTROM MANUFACTURING CO. 646 N. Aberdeen St. Chicago, Illinois

## DON'T LET Soggy Air Lines Tie Up Defense Work!

Aridifer cleans and dries compressed air or gas by centrifugal inces. Four ball-bearing rotors effectively remove moisture, oil, dirt, fine scale. Water-logged valves, puttied sand blast nozzles and spoiled sprayed finishes are completely eliminated. Reduced



maintenance costs quickly pay for the Aridifier. Thousands in use. Stocked for standard pipe sizes from % to 10°.

Send for Bulletin 939 and FREE trial affer.

LOGAN ENGINEERING CO. 4016 Lawrence Ave., Chicago, III.

Offices in Principal Cities

The ARIDIFIER

## More and More

Users are coming to Acme for their Jig Bushings



Because Acme quality is maintained and good delivery schedules are kept.



# ACME INDUSTRIAL COMPANY

210 N. Laflin St.,

Chicago, Ill.

MONroe 4122



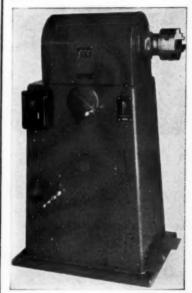
Engineering Company

Frankenmuth, Mich.

The manufacturer stresses the friction type clutch with which the transmission is equipped. The double disc wet clutch and gear provide the reversing unit.

#### Low-Speed Variable Speed Lathe

Precise lapping of gauges and other parts, at extremely low speeds—as low as 20 r. p. m.—with ample power, is now possible with a new variable speed lathe.



Capable also of rotating heavy work—up to 4,000 r. p. m.—it is especially adapted for final finishing operations, such as filing, burring, or polishing.

Infinitely variable speeds—from a low of 20 to as high as 4,000 r. p. m. are available. These speeds are in a ratio of 5½ to 1, based on the lowest speed desired by using a single-speed motor, or 11 to 1 with a 2-speed motor.

Optional is an adjustable slippage arrangement between motor and spin-

### for All Kinds of Small Work



Self contained and well built. Quick to change for length and diameter, for both shoulder work and gauging from the end. Chips fall away from gauging parts.

A.S.A. Standard bushings with liners to drill any size hole up to ½ diameter. One bushing furnished with Jig. V block to center work. Can be made any form for holding special pieces. Locking handle can be reversed for either hand.

Let us send you more information.

## RACINE SCREW WORKS

RACINE

WISCONSIN



FOR LATHES, HAND SCREW MA-CHINES, GRINDERS and MILLS

The features that interest you most:

1. Simplicity, sturdiness, and heavy duty.

2. 50% more radial load carrying capacity than the average live center.

 Large spindle, small head, short overhang, most desirable for rigidity and to be free from chatter.

4. With the aid of cap screw you can lock spindle to redress point right in your machine.

5. Special oil seal to retain lubricant and keep out foreign matter.

 A compression pad to compensate for heating and expansion of metal as a safety factor, with reasonable diligence exercised.

A folder giving prices and complete detail will be mailed to you upon request. A ten day trial. If not perfectly satisfied your money will be cheerfully refunded.

MOTOR TOOL MANUFACTURING CO., 12282 TURNER AVE.



### ... for all contour-sawing, iig and band saw machines

A machine for contour-sawing is no better then its saw. Milford Profile Saw is the fastestcutting, most durable saw made — by the world's largest, most experienced manufacturer of metalcutting band saw.

For years Milford Profile Saw has been sold largely under the private brands of machine manufacturers. Now you can obtain it from your Mill Supply Distributor, No delay,



THE HENRY G. THOMPSON & SON CO., New Haven, Comp.

REZISTOR HACKSAW BLADES — PROFILE SAW

dle, permitting application of only a predetermined amount of pressure on \*

the part to be lapped.

Equipped with standard Nema frame motor, exclusive, quick - acting automatic brake of velvety smoothness: 3 or 4-jaw chuck, or special fixture for holding the work.

#### Given Machine Tool Drives

The Given Vari-Speed Motor Drive provides positive, infinitely variable speeds within its ratio of 4 to 1. It permits instant regulation of spindle or cutting speeds to a fraction of a revolution per minute. It is asserted that a 16". 3 - step double back geared lathe can be operated at from 20 to 710 r. p. m., with instantaneous choice of any speed within these limits.

A large diameter single take-off pulley

eliminates all belt A convenient hand wheel shifting. provides for speed changes while in operation. Features include one piece frame; low center of gravity; dynamically balanced pulleys with ground belt surfaces; oversize sealed ball bearings throughout; no gears. Sizes 1 to 5 h. p., are available. Made by Given Machinery Co., 2016 Santa Fe Ave., Los Angeles, Cal.



A 30th-anniversary catalog of Atlas machine tools and shop equipment has just been released. This attractive new 72-page book includes complete information on 1941 models of Atlas lathes, drill presses, arbor presses, and shapers, and announces two new machines-a compact bench miller and a multiple spindle drilling machine. Copies are available from Atlas distributors or Dept. 7, Atlas Press Co., Kalamazoo, Mich.



## NICHOLSON CONTROL VALVES

are made in two, three and four-way types for air, oil, water, steam, gas, etc., pressures to 5000 lbs. Style E is a general purpose valve for pressures to



300 lbs. Various metal combinations to suit any medium. Style J is for air and oil only, pressures to 125 lbs. Style H is a balanced hydraulic valve for pressures to 5000 lbs. We also manufacture foot, solemoid and motor-operated valves.



Bulletins on request.

OTHER NICHOLSON PRODUCTS: Mandrels, Arbor Presses, Flexible Couplings, Steel and Stainless Steel Floats, Steam Separators, Steam Traps, Air Separators, Air Traps, Air Vents, Etc.

W. H. Nicholson & Company

117 OREGON STREET

WILKES-BARRE, PA.

## THE NEWEST REED MACHINE High Speed — Greater

**Precision at Lower Cost** 

Definitely new and different, the Type 25 Bench Drill combines streamlined efficiency and simplicity. Only two castings form the base and column, assuring rugged strength. Drill chuck is the only moving part exposed. Infinite speed range from 2000 to 10,000 r. p. m. Capacity is ¼\*. Spindle travel is 3\*. Equipped with finest precision ball bearings throughout. Also floor type Drills.

Write TODAY for bulletin giving full details.

Centerless Feed Polishing Machines and Abrasive Belt Surfacing Machines.

Production Machine Co.
Greenfield. Massachusetts

### "PENCILPOINT" DIAMONDS

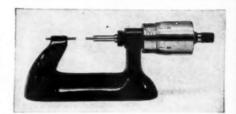


### for Truing Grinding Wheels

This is one of our specialties for light work. No resetting of diamond is required. \$1.50 each; \$1.20 each in lots of 10; any size of steel shank. Discounts in quantities.

F. F. GILMORE & CO., 112 Dartmouth St., Boston, Mass.

Illustrated is a Tavannes bench type micrometer, well-known in Europe among watch and similar precision manufacturers. These vertical and horizontal instruments are being imported from Switzerland by the Park Sales Co., 3 Park Place, New York City.

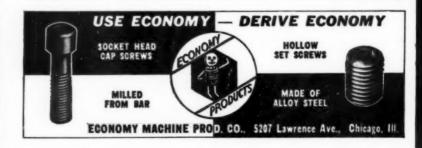


#### Case Studies of Machining Problems

As a means of aiding American manufacturers to gain greater output from existing equipment, Gisholt has been issuing performance data sheets outlining the practical solutions to varied machining problems encountered in their customers' plants. The sheets included in the current mailing in this series explain how the production of Diesel engine fuel injector bodies, garage equipment parts, collets, and tractor steering - clutch - drums was speeded up on turret and automatic lathes.

Concise explanations of the machining methods employed for these representative jobs, including information on feeds, speeds and production times, are given in each case-study. Tool layouts are shown in diagram form to further increase the value of these sheets to machine operators, foremen, engineers and superintendents.

Copies of sheets, Nos. 66 to 69, may be had by writing to Gisholt Machine Co., 1185 East Washington Ave., Madison, Wis.



#### Accidents

Much has been said about industrial accidents in recent years. Many steps have been taken to increase safety in shops with gratifying results.

Last year, however, no single catastrophe in the United States approached the daily average of almost 100 lives lost in automobile accidents.

Automobile accidents on an average day last year took twice the number of lives lost in the Kenvil, N. J., powder blast and four times the toll of the Little Falls train wreck. The number injured in traffic on an average day exceeded the total casualties of the six major disasters of 1940 combined.

These facts are reported in a new booklet announced by the Travelers Insurance Co., Hartford Conn.

Hartford, Conn., and titled "Here Today—". The title naturally suggests that it will be "gone tomorrow" for those who continue to flout the traffic laws and the rules of safety in 1941. Then the familiar saying is changed to a new life-saving slogan: "Care Today—Here Tomorrow."

Highlights from this annual report include the following interesting facts:

Exceeding the speed limit was responsible for 40% of the fatalities and 26% of the injuries in 1940.



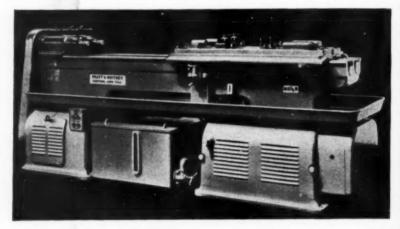
Almost 86% of all fatal accidents occurred in clear weather and 78% happened when the road surface was dry.

An outstanding feature of the booklet is a section devoted to what the editor calls "the traffic disaster of October 4." Several pages are devoted to a vivid description of the traffic "disaster" which swept the nation on that day when 85 persons were killed and 1,496 were critically injured. It is then pointed out that October 4 was an average day in every respect.

#### Two New Deep Hole Reamers

New models of No. ½B and No. 1B deep hole reamers are announced. These improved machines are designed primarily for reaming rifle barrels, but are also well suited to any other deep hole reaming work within their range.

ing away from it. The feed is hydraulic and may be set for the most satisfactory speed, for it is infinitely variable from 2" to 10" per minute. The spindle is equipped with ball bearings and is driven by a V-belt. Rapid



These reamers are of "twin" design. Each machine incorporates two complete reaming units. This saves floor space and makes it possible for the operator to feed or to check one unit while the other is in operation.

Work is held in a fixture on the work carriage and is fed toward or away from the rotating reamer, although best results are usually obtained by feed-

traverse permits a return speed of 30' per minute.

The ½B has a reaming capacity of from 3/16" to 5%" diameter. Machines are offered with length capacities of 30" and 50". The 1B has a reaming capacity from ½" to 1" diameter. Length capacities offered are 50" and 74"

These machines are arranged for mo-



Why Not Buy The Original Electric Etcher?

MARK IRON AND STEEL

THE ETCHOGRAPH WAY

New ELKONITE TIP pencil.
New Baby Grand Model at a lower price.

2,000
in use

BREWSTER - SQUIRES CO. 42 Church St., New York, N. Y



### **MARKED-IDENTIFIED**

Permanently

PART NUMBERS HEAT NUMBERS, CATALOG NUMBERS, SERIAL NUMBERS,

PATENT NUMBERS

MANUFACTURER-INSTRUCTION DATA-INSPECTION

Positive, Permanent marking on your products assist prospects to order. Makes it easier to buy—new, repeats and repairs. Gives you a delimite record of pertinent data on each part produced.

The Pneumatic marking machine illustrated is our hi-duty model 25 general purpose tool for short runs or production work. It operates from your shop air line and is one of numerous models built to produce nest, permanent markings quickly on metal fabrications.

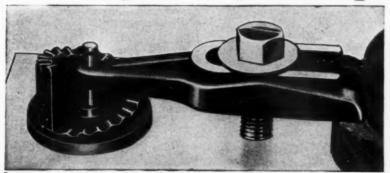
We will be happy to make specific recommendations upon receipt of samples or prints of parts to be marked, showing approximate lettering, its location on the part, with required hourly production.

MARKED PARTS ADVERTISE
IN THE RIGHT PLACE, AT THE RIGHT TIME.

Send for complete catalog of our full line of marking Tools, Machinery and Equipment.

GEO. T. SCHMIDT, Inc.
1802 Belle Plaine Ave., Chicago, III.

## K-O Adjustable U-Clamps

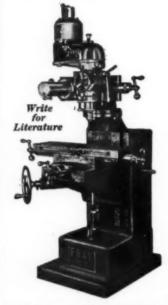


K-O Adjustable U-Clamps are made in 3 styles and six sizes, Cut shows our No. 4 for ½ or 5/8 in. bolt. Price \$1.25 each.

Send for circular showing all sizes, specifications and prices.

K-O PRODUCTS CO.
BENTON HARBOR, MICHIGAN

## ONE WORK SET-UP AND THIS MACHINE WILL DO THE REST



"ALL ANGLE" MILLING MACHINES AND

MILLING ATTACHMENTS.

MANUFACTURED BY

MACHINE TOOL CO.

GLENDALE, CALIFORNIA.

U. S. A.

tor drive with built - in automatic starters and push buttons for each motor. Regular equipment of the 1/2B includes two ¾ h. p. constant speed geared spindle motors and two 2 h. p. motors for hydraulic feed pumps. The 1B is equipped yith 1 h. p. and 3 h. p. motors respectively.

#### Safety is Just Common Sense

For a long time nobody thought there was such a thing as a perfect safety record. It was taken for granted that accidents were bound to happen one way or another.

Then as the Safety Movement began to grow and spread, it was definitely proven that a man could work a lifetime without suffering an accident and that entire plants could work weeks, months, and even years without a sin-gle lost-time accident.

Why shouldn't we have more such perfect Safety Records?

We know that things with sharp or jagged edges will cut. We are careful to avoid those cuts.

We know that grinding, chipping, welding and many other jobs are dangerous to our eyes. We protect them by wearing the proper type of safety goggle or shield.

We know that excessive pulling, pushing, or lifting will cause strains and hernia. To avoid such an injury. we get help or employ the use of me-

chanical equipment.

We are careful in the selection and placement of ladders because we are aware of painful results caused by improper types and positions of ladders.

We know that moving machinery is dangerous and we do our work with

And so it goes with every other accident cause. We know what causes every type of accident and we know

how to avoid the hazard.

Boiled down, Safety is just as simple as that. Therefore, let's make up our minds to think and work safely, which will not only save us pain and wages, but it will make our plant outstanding in the Safety Movement.

> (Fisher Body, Pontiac Division in National Safety Council News Letter)

#### Materials

Although the United States is better supplied with basic raw materials than any other nation, 14 strategic materials present a problem.

Called "strategic" because they are vital to national defense, the commodities are:antimony, chromium, coconut shell char, ferrograde manganese, manila fiber, mercury, nickel, mica, quartz crystal, quinine, rubber, silk, tin, and tung-

There are four possible ways of overcoming such a problem. first of these would involve the development of sources alternate of supply, prefer-ably in the United States, or at least in adjacent countries. The second course would involve the substiother tution of materials wherpossible ever especially in ci-

vilian uses, to release needed commodities for purposes of national defense.

In the third place, under emergency conditions, it would be possible to curtail civilian consumption in greater or less degree and thus divert available materials to military use.

Finally, stock piles or reserves of the most vital commodities that are obtainable only from foreign sources could be accumulated. It is important to distinguish between stock piles and reserves. In other words, reserves ought





#### THIS NEW LATHE CENTER:

Expels heat from work caused

by cutting tools.
Conveys center lubricant to
extreme point of work and center.

entire Lubricates bearing surface of work and center.
Grooves hold a supply of center lubricant for the purpose of replenishing any amount that dissipates account of

No stopping of lathe to relubricate center or work. No readjustment of tail stock

necessary. No dripping or crushing out lubricant. Frictional heats reduced.

Expansion of work kept at a minimum.

Reduction of power or thrust load set up between tail stock and lathe head.

SEE THIS UNUSUAL CENTER IN ACTUAL OPERATION AT BOOTH 332, ASTE SHOW MARCH 25-29, 1941, DETROIT, MICHIGAN

Chicago Mfg. & Distributing Co. 1928 W. 46th ST. CHICAGO, ILLINOIS

> not to be regarded as a source of supply under ordinary conditions.

> The Strategic Materials Act was passed by Congress in June, 1939. Various agencies have been set up, of which the two most important are probably Rubber Reserve Co. and the Metals Re-Stock piles of antimony, serve Co. manganese, chrome ore, tungsten, tin, and rubber are already taking shape. An estimated \$700,000,000 will be so spent by the government in the next few years.

#### T.C.M. Carbide Tool Grinder

T.C.M. Mfg. Co., Harrison, N. J. is marketing its "All-In-One" grinding and lapping equipment which has been developed for the maintenance of cutting tools of all types. Offered in bench and floor models, there are five types of head assemblies with alternative wheel and lap equipments.

Complete accessory equipment is available, by means of which special

#### "WESTLEN" self-centering REEL FOR COIL STOCK

Coils are automatically centered by a few turns of adjustment wheel which eliminates tipping, back-lash and saves considerable time and trouble. Head is mounted on thrust ball bearings, giving smooth running action.

### CLAMP TO HOLD STOCK

One-Piece Ad-justable Clamp which holds stock in perfect position. Quickly adjusted when changing stock.



CROSS PIECE Easily converted to vertical or horizontal posi-tion and adjusts height of reel.

#### ADJUSTMENT REEL

A few turns automatically adjust posts to suit diameter of the coil. PRICED WITHIN REASON

#### RULETA COMPANY New York, N. Y. 26 N. Warren St.,



operations other than grinding and lapping can be carried out conveniently. Included in this equipment are:-a groove grinding device for forming chip control grooves in cemented carbide tips: a substantial production type protractor with micrometer feed for accurate duplication of tool profiles; a tip cutting attachment for resizing and salvaging carbide tips, and a drill grinding attachment which has a capacity of from 1/4" to 1-1/4" diameter twist drills.

A high grade motor with pre-loaded S.K.F. ball bearings, operates at 1750



STYLE A

### The HAMILTON PORTABLE ELEVATING TABLE—"PORTEL VATOR"

No strained backs or bruised fingers if you let the Hamilton "Portelvator" do the lifting for you. Use it as means of support—Use it to level large overhanging piaces of work—Use it as a bench to work on—An economical and

efficient helper-One to twenty ton hand or power operated.

Write for full details today.

#### THE HAMILTON TOOL COMPANY Ninth and Hanover Streets. HAMILTON, OHIO

Anderson Balancing Ways

#### Better Work in Less Time

A profitable device for every shop handling rotating parts. It's simple, sturdy and dependable for balancing straightening and truing operations.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, a prompt positive indication of either perfect or imperfect balance.

Write for attractive price and details.

ANDERSON BROS. MFG. CO.



Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

# A Necessity for the Modern Tool Room and Inspection Departments



Milwaukee Surface Plates, Angles, and Parallels are indispensable in this day of modern production where accuracy is required.

Write today for full information

J. C. BUSCH COMPANY

165 South Barclay St.,

ENGINEERS AND MACHINISTS SINCE 1907

MILWAUKEE, WIS.



SCREW MACHINE CIRCULAR
TOOLS IN STOCK. Write for Complete List.

Banner Manufacturing Co. 1871 Clybourn Ave., Chicago, Ill.

GROMAR FAST

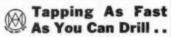
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MARKING & NUMBERING
MACHINES HELP YOU
DO A GOOD MARKING JOB.

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SPECIALISTS ABOUT ANY
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THE ACROMARK
CORPORATION
25 No. Road 31
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with the A.M. Sensitive Tapping Machine . . . from the smallest and finest up to %\* diameter in steel and iron—and up to 4\* in softer materials. A modern unit



A- MUEHLMATT DIVISION

THE HAMILTON TOOL CO.

Ninth and Hanever Streets,
HAMILTON, OHIO

r.p.m. which, with the wheel equipment provided, meets the demand for lower grinding speeds necessitated by widely used types of cemented carbide tools.

Right and left hand tools are ground with equal facility by having a 10° convex angle on the face of the grinding wheels and diamond metal laps which provide the equivalent of a large diameter wheel, used peripherally. The slight concavity thus formed on the ground face facilitates the lapping of the small lands on the cutting edges of carbide tips, while the extra expense and complication of a reversing motor and switches is avoided.

A specially designed brazing fixture is available for users who wish to braze their own tips on the tool shanks or bodies. With this fixture it is a simple and easy matter for shop help to do a first class job of brazing tips on lathe tools, reamers, milling cutters and similar articles.

#### "Rockford" Lathes Move West

It is announced that the line of Rockford "Economy" lathes, manufactured by the Rockford Machine Tool Co., Rockford, Ill., has been sold to the D & M Machine Works of Torrance, Cal. Arrangements have been made to move all drawings, blueprints, patterns, jigs, fixtures and tooling to Southern California.

Last Fall, pressure was brought upon the Rockford Machine Tool Co. by the Defense Commission, which necessitated that company giving up the manufacture of its line of lathes and concentrating its activities on other products, upon which it held exclusive patents.

An attempt was made by a large "Rockford" dealer to interest other machine tool builders in the East in manufacturing this line, but they were all working overtime.

It is interesting to note that the Rockford Machine Tool Company required substantial evidence that their line could be duplicated in California with regard to materials and workmanship before they would permit their name to be used.

#### **Gun Barrel Chambering Machine**



A new gun barrel chambering machine is announced by a New England manufacturer. It performs the various operations in the butt end of a previously drilled, reamed and rifled gun barrel, producing the accurate chamber necessary to receive the cartridge. The gun barrel is held at one end in the work spindle by a leveroperated collet chuck. Its outer end is supported in an adjustable steady rest with spring operated jaws, which allow the barrel to float.

The turret of the machine contains 10 tool spindles, each fitted with a tool adapter. The turret unit is adjustable along the bed and is clamped in position to suit the job. After the work spindle has been started, all succeeding operations are controlled by the capstan type wheel. As the hand wheel is turned at the start of the operation, the uppermost spindle (which is in line with the work spindle) feeds forward until checked by the depth stop. Upon withdrawal of this spindle, the turret indexes and the next spindle is brought into line. The ten tools working successively complete the chamber.

The work spindle is driven by V-

belts from a variable speed unit. The manufacturer stresses the value of a

#### DYKEM STEEL BLUE STOPS LOSSES

making dies & templates



Simply brush on; ready for the layout in a few minutes. The dark blue background makes the layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy. Write for full information.

#### THE DYKEM COMPANY

2381 G North 11th ST., ST LOUIS, MO.

## Steel Equipment

for Office, Factory and Tool Room

BINS — BOXES SHELVING TABLES — DESKS CABINETS — LOCKERS



No. L-339

1 Battery of 3 Lockers each 12" wide x 12" deep x 60" high with hat shelf, coat hooks and attachment for locks.

(Locks Extra) - \$14.65 F.O.B. Cleveland, Ohio Shipped Knocked Down

## THE INTERIOR STEEL EQUIPMENT CO.

2352 EAST 69th STREET CLEVELAND, OHIO cam device which automatically engages the correct work spindle speed as each spindle is brought into place.

The No. ½B, as it is designated, has a swing over bed of approximately 20" diameter. It will handle a maximum gun bore of %". Models are offered with a maximum work length of 30" and 50". These machines require a floor space of 114" by 38½" and 134" by 38½" respectively.

#### Mechanite Bulletin

The Meehanite Research Institute of America, Inc., 311 Ross St., Pittsburgh, Pa., has compiled a collection of articles about Meehanite castings into a booklet entitled "Meehanite in Industry." The book contains 49 pages and a number of articles covering descriptions of applications of Meehanite castings in a wide variety of industries. A table of contents page permits easy finding of an article on any subject of specific interest.

## Work Wanted

A NATIONALLY KNOWN MANUFACTURER OF PRECISION MACHINERY HAS FACILITIES FOR TAKING ON ADDITIONAL WORK for: W. & S. Turret Lathes, Boring Mills, Lathes, Punch Presses, Screw Machines, Precision Cylindrical and Internal Grinding, also Sub or Full Assembly Work.

#### **BOX 142**

c/o Hitchcock Publishing Co.

508 S. Dearborn St., Chicago, Ill.

#### "Creeping"

To what extent me t a ls will "creep" and "re-lax" during many years of service in steam turbines, motors, and other machines, is the problem of Dr. A. Nadai, Westinghouse scientist, and his associates.

These research workers have developed many high speed tests in a n endeavor to meet the demands of steam turbine builders who wish to make parts that will stretch less than one-tenth of one per cent during 10 years of grueling service at a temperature of 1,000° F. The investigators' new constant strain rate machine can make such measurements quickly.

In a typical test with the machine, a sample bar of cast carbon steel ½" in diameter was stretched 10 per cent of its length in four

minutes. The automatic relaxation machine was used to study how bolts in turbines and gasoline engines "relax" under stress and sometimes become loose.

As the piece starts to "creep," or stretch, the machine automatically prevents any change in length by starting an electric motor which reduces the pulling force a few pounds. Thus the test goes on automatically for about a week, with the force being lessened



## Maximum Capacity Bearings ... for greater combined



Send now for descriptive Bulletin.

The greater number and size of balls supporting the races increases load possibilities in the new McGiLL Maximum Capacity Double Row Ball Bearing. This new construction is ideally suited for heavy radial or thrust loads or any combination of such loads. A McGiLL Bronze Retainer in two sections allows for independent rotation of the two rows of balls—important under severe operating conditions.

radial and thrust loads

Bearing Division

MANUFACTURING CO.
1700 North Lafayette Street
VALPARAISO, INDIANA

enough to restore the piece to its original length each time it stretches two millionths of an inch. The machine also draws a jagged line on a sheet of paper giving a record of the "relaxation."

Dr. Nadai has explained that tests such as these will remove much of the doubt surrounding the proper selection of materials for turbine bolts and similar parts. It may permit the use of less expensive alloys.

## SIMMONS-

# Heavy Duty Lathes WITH Micro Speed DRIVE



- Maximum Flexibility of Speeds
- Timken Precision Spindle Bearings
- Snap Levers for Apron Feeds
- Added Efficiency Under Heavy Loads

SIMMONS LATHES are manufactured in 16°, 18° (illustrated at left) and 20° standard; 16°/25°, 18°/27°, 22°/34°, 20°/40°, and 28°/50° gap bed in all bed lengths.

Write Today for Descriptive Bulletins.

## SIMMONS MACHINE TOOL CORP.

1725 Broadway, Albany, N. Y. Singer Bldg., New York City

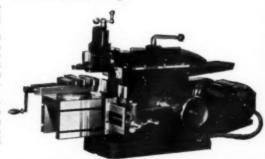
#### A New Small Shaper

A Shape-Rite Shaper is announced which will handle work up to 8' stroke. Offered in both floor and bench models, this shaper is said to be rigidly designed so it will handle work that is normally done on a larger machine.

The manufacturer emphasizes that all of the castings used in this shaper are subjected to a specially developed method of heat treat-

The top working surface of the table is 7" x 7%". The table has a horizontal travel of 12½"; vertical travel is 6". The adjustment of ram is 9". The ram bearings are 20" long and are so designed that the ram is always completely in the bearing at full stroke, even when adjusted forward.

The bull gear is equipped with Timken roller bearing. The gear shafts



turn in single and double row ball bearings. The tool head is 3½" wide; it has a vertical travel of 4".

The drive provides four different speeds, resulting in 40, 80, 120, or 160 strokes per minute. The cutting speed varies approximately from 26 to 106 feet per minute. The shipping weights are:—bench model, 320 lbs.; floor model, 435 lbs.

## IF YOU NEED Turrets QUICKLY



PLAIN OR BACK GEARED. Spindles mounted on Timken Precision Tapered Roller Bearings. Levers within immediate reach of operator. Head cast solid with bed, insuring rigidity.

The new SIMMONS No. 2 (11/4") Turret Screw Machine is ready for early delivery. The nation's leading aircraft manufacturers, among other users of this sturdy machine, are outspoken in their praise of its high-precision performance.

It has been designed with the greatest simplicity. Production tooling equipment adaptable to other standard turret lathes of similar size is also applicable to the Simmons machine.

The SIMMONS MICRO-SPEED DRIVE, equipped with push-button control and magnetic brake, offers a range of spindle speeds up to 1,500 RPM by a mere turn of a handwheel.

To insure the earliest delivery, write today for complete details.

## SIMMONS MACHINE TOOL CORP.

1725 Broadway, Albany, N. Y

Singer Bldg. New York City

#### Machine Tools and Defense

Machine tool production for 1941 will total \$750,000,000, an increase of \$300,-000,000 over 1940, it was announced today by Clayton R. Burt, chairman of the defense committee of the National Machine Tool Builders' Ass'n., following an industry-wide study of ways and means to accelerate production.

"In view of the mounting requirements for national defense." Burt said, "the nation's machine tool builders have conducted an exhaustive survey of methods and facilities in an effort to put into immediate use every possible means to increase output.

"This survey, just completed, points toward a total machine tool production of \$750,000,000 in 1941—\$300,000,000 above 1940 production, and \$100,000,000 greater than preliminary estimates for 1941 made earlier in the year.

"We are confident that the \$750,000,-000 goal may be reached by increased

subcontracting, by working overtime, by maximum utilization of equipment, and by plant expansion where necessary.

"We know that the program of increased output will be backed by all of the men working in the nation's machine tool plants, who are aware of the urgency of the situation and are doing their utmost to aid the country's program of national defense.

"The machine tool industry is in complete accord with various plans for surveying existing machine tool facilities so that all machine tools now standing idle, or used only part time, may be put to work to the utmost of their capacity.

"The industry feels confident of its ability to meet national defense requirements as rapidly as these requirements materialize. This is borne out by the fact that whereas the industry anticipates total production of \$750,000,000 in 1941, present orders total only \$423,000,000."





The Big New 570
For Economical Salt, Cyanide and Lead-Hardening,
\$248.00 F. O. B.
Cedar Rapids, Iowa

Ideal for tool and die makers for case-hardening and for pattern and model makers for melting lead, zinc, aluminum and nickel-silver. Steel pot is 14\*x20° in diameter. Furnace completely equipped with General Electric motor and large blower. Send your own Specifications for Quotations, to Johnson Gas Appliance Co., 602 E. Ave. N. W., Cedar Rapids, Iowa.



Johnson Gas Appliance Co., 602 E. Ave. NW. Cedar Rapids, Iowa

Send me full information on No. 570

Name ......

City

State

#### Double-Edged Hack Saw

Two cutting edges on a single hack saw blade are now a reality in a new development of Millers Falls Co., Greenfield Mass.



Obstacles which have prevented the successful manufacture of such a blade until now, have been the set of hack saw teeth, which makes it difficult to keep the trailing edge from dragging in the slot, and the excessively high cost of breakage.

It is explained that both of these problems have been solved—avoiding drag by setting teeth of the first edge fractionally wider than those of the second, and eliminating breakage by an advancement in heat treating technique which leaves teeth hard and ends and center soft. It is claimed that these blades are unbreakable and shatterproof and that positive feeds at twice the usual maximum depth of cut do not impair cutting efficiency.

The blade costs only 50% more than the single edge type and is claimed to do twice as much work per blade, at a cutting speed twice the usual maximum. This cash and time saving, together with the safety and delay-proof production made possible by the blade's unbreakability, means much to America, especially at this time when the metal working industries are being pushed to capacity.

#### Electrodes

Nazi a i r raids reduced British industrial production an estimated 15%. but this has been offset in large degree by improved m anufac turing methods, accord-ing to George F. Clipsham, Managing Director, Lincoln Electric Co., Ltd., Welwyn Garden City, England.

Interviewed in Cleveland recently, Clipsham cited use of large size arc welding electrodes as a major factor in the success of British industry in speeding up production of vital equipment.

In one instance, recalled by Clipsham, larger size electrodes made a reduction of welding time on a marine mine from 4-½ to 2-¼ hours. Proportionate r eductions are being noted in manufacture of tanks, shells, g u n carriages, a n d many other defense items.

So important is welding in the British industrial picture today that a Welding Advisory Group has been set up under authority of the Minister of Supplies to study welding operations.

"Time savings as high as 50% have been made possible," Clipsham said. With larger electrodes, welds are made at much faster rates since more metal is deposited per given unit of time.



Our representative will gladly explain to you how KENNAMETAL carbide-tipped tools can, on an average, DOUBLE your production when turning, boring, facing, and shaping steel of all hardnesses up to 550 Brinell. Also ask about KENNAMETAL lathe and grinder centers made with nibs of the special KENNAMETAL grade KWH, which is nongalling and outlasts center of high speed steel from 50 to 100 times.

If you can't attend the A. S. T. E. exhibition, write for free literature which gives complete details.



Although large size electrodes are used to some extent in the United States, Clipsham estimates that their full utilization would save thousands of much needed man hours for industry.

"Suppose," said Clipsham, "that there are 50,000 arc welders not now using large electrodes. By going to the larger sizes, they could each save at least 10% of their time which would make a total daily saving of 40,000 man hours."



Lost motion, false motion and unnecessary motion all cost money. Only a little at a time perhaps, but over the period of a year, the total would be impressive. Why not save this?

Useless motion also represents a loss. Lifting heavy coils of wire wastes time and energy. Why not let NII SON save this too?



A foot lever is tripped, the quards removed, a coil of wire slid upon the carrier, the quards replaced and set screws tightened, an easy lift, and the counter-balancing weight does the rest, bringing the tilting section to a vertical position, ready to feed the wire into the machine.

Send today for Bulletin No. 51 and learn how you save in other ways too

## The A. H. NILSON Machine Co.

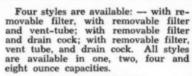
#### Trico Gravity Oiler

A new, visible, unbreakable, dust - proof Oiler is announced by the Trico Fuse Mfg. Co., 2948 No. 5th St., Milwaukee, Wis.

A unique feature is the removable filter that can be extracted for cleaning in less than five seconds without tools or waste of time. Unscrew dome and remove filter—that's all. Filter

is a combination of 100 mesh brass screen and felt.

Oiler is mounted at top of the part to be lubricated and any predetermined number of drops of oil per minute can be obtained by a simple adjustment of the needle valve. The shut-off lever at the top, when in a vertical position, as shown, feeds oil and when tilted to the side, stops the flow.



#### Die Steel Bulletin

A newly published folder presents Crucible's High Carbon High Chromium Die Steels.

An important characteristic of these Die Steels is said to be their exceptional resistance to wear. Variations in carbon and molybdenum content provide graduations in toughness. All give high production between grinds.

It is claimed that these Die Steels offer in addition, greater economy, since they can be ground more times before wearing out due to deep hardening properties and removal of less material at each regrind.

Address Crucible Steel Co., of America, 405 Lexington Ave., New York, N. Y.

## CHECK THESE FEATURES

## of the Nilson Automatic Metal and Wire Forming Machine

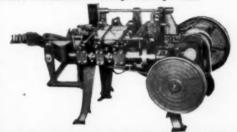
Open construction of press and forming tools.

 Patented slide feed with an independent cam-operated wire gripping device.

Power operating wire feed is transmitted through a straight line.

The NILSON AUTOMATIC Metal and Wire Forming Machine meets Today's industrial requirements. Engineered with a 50-year back-ground of experience in designing and building metal forming machines, this S-3-F machine is setting new records in speed and uniformity of products.

Write TODAY for information on all types of metal forming machines



## The A. H. NILSON Machine Co.

#### Marking Parts In Lathe

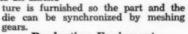
Machine shops and factories using lathes c an mark products or parts with this new combination steel roller die and holder which fits in the tool post of standard lathes.

The steel roller die can be engraved with any numbering, lettering or design and

when asembled it is a simple matter to clamp the part in the lathe chuck, then rotate the lathe by hand rolling in a

perfect marking.

If interchangeable lettering or numbering is to be done, then the roll can be made to receive segment style interchangeable steel type. For continuous marking where the part must completely rotate for applying graduations to a ring for example, then a larger fix-



Production Equipment
Catalog

Acme Tool Co., 125 Church St., New York, N. Y. announce a new catalog No. 39 covering production tools, machines, fittings, accessories, etc. Stanley Industrial Tools

A complete new catalog (No. 50) showing Stanley Tools for Industry is announced by Stanley Tools, New Britain, Conn. An alphabetical index is printed on the cover for quickly locating the various classifications of items. A more detailed index is included inside the book.

While the tools shown are for use in all types of industrial production and maintenance work, items particularly suited for the Aircraft Industry are marked by an illustration of an Airplane. The catalog measures 8-½" x 10-%" and is punched for a Kalamazoo binder.

#### Helical Groove Lathe Center

A new lathe center is announced which features a helical groove. This novel design is said to provide lubrication for the entire surface of work supported by the dead center or tailstock. It is asserted that this type of center has an operating ratio of about 15 to 1 in running time compared to the conventional type of lathe center.

The grooves hold a supply of lubricant, replenishing that which is dissipated or oxidized by heat of cutting or work expansion. The manufacturer claims that advantages of this lathe center include:reduction of time ordilost, stopping narily lathe to relubricate center or work; no readjustment of tailstock is necessary; lubricant will not drip or be forced out of work.

The helical groove design is also said to be a satisfactory means of cooling and lubricating work on a grinding machine which ordinarily uses soluble oil or other coolant-lubricants.

The manufacturer intends to display this lathe center at the A. S. T. E. show.

#### Vernon Offers New Vertical Head

Announcement of the addition of a new vertical head for use with the Vernon No. 0 Horizontal Mill extends the range of this already versatile machine.



Designed expressly to operate with the Vernon Mill, the new head can be used freely at any angle and in any plane. Spindle of the attachment has a No. 7 B4S taper and is driven through compound bevel gears carried in the head, which swivels in a plane parallel to the axis of the shaft. Designed to speed production work, the unit is quickly installed by removing

GROBET FILES

the most complete catalog of its kind, illustrating hundreds of rotary files hand cut, milled cut, ground from the solid; also diesinkers' burs.

GROBET FILE CORP. OF AMERICA 3 Park PL, New York, N.Y.

the overarm of the machine. are held by a draw-in collet.

The Vernon Line of Horizontal Milling Machines, Combination Vertical Milling Machines and Jig Borers is manufactured by the Machinery Manufacturing Co.. 1915 E. 51st St., Vernon, Los Angeles, Cal.

#### A Motorized Planer

Illustrated is an interesting application of motor drive to a Powell 48 x 48" planer. A multiple V-belt connects a 10 h. p. motor to the input shaft of a No. 3 Flexoid speed control unit, while a roller chain is used from the unit output to countershaft of planer. The original hangers are retained by replacing the plain bearing boxes with anti-friction boxes.

This Flexoid speed control unit offers four speed ratios:-1 to 1, 11/2 to 1, 2 to 1, and 3 to 1. It is operated by a conveniently located hand wheel which does not interfere with operation of the

stages and sizes Giled Chaled Chaled The manufacturer offers folder FSC-124-A. which shows various applications



of Flexoid speed control units, Address the Smith Power Transmission Co., 1545 E. 23rd St., Cleveland, O.

## Write for Catalog WF

The most complete catalog of its kind. Lists 5000 different shapes, sizes and cuts of GROBET Precision Swiss files.

Learn more about these chrome Steel Files that have won a reputation for utmost precision and durability.

Ask also for catalog WM on Files for Filing Machines; catalog WR on Rotary Files and Diesinkers' Burs.

FILE CORP. of AMERICA



SCHAUER 2064 Reading Road, Cincinnati, Ohio

## 3/8 to 51/2 inches



Knock-Out Expanding Mandrels save needless and repeated expense in making special arbors for each job. Too, they are accurate within .001 of an inch—an accuracy that can be indefinitely maintained.

#### K. O. Lee Company

Aberdeen, South Dakota

#### Higher Rates In Defense Production

Seventy - five millimeter shells are being roughed out 19 times faster to-day than they were during the last war. Fred C. Dull, vice president of the Monarch Machine Tool Co., told a group of I. B. M. engineers recently.

During the last war, it took 12 minutes to rough out a 75 m.m. shell, he said. Today the same job is being

done in 38 seconds.

Showing how engineering development of machine tools has tremendously speeded up production of defense equipment, Dull said that gears used in defense equipment which were ground at the rate of three pieces per hour in the last war, are now being shaved at the rate of nearly one a minute, and that deep-hole drilling in solid metal, which formerly required four hours, is now being done in 15 minutes.

Dull predicted that "machine tool production in 1941 will far surpass \$650,000,000." This would almost quadruple peak production of 1929 and compares with a depression low of \$22,500,-000 in 1932. Menarch is making the third addition to its plant in 18 months, an expansion that will increase the company's employment on the production of lathes for the defense program another 40%.

"The machine tool industry has just one big job before it today," Dull said, "and that job is equipping the manufacturers of this country for the production of national defense equipment. All other considerations have long since gone by the boards. Ours is a key industry in national defense—and we are going to fulfill our responsibility."



## EVANS High Speed Steel REAMERS



#### LOOK AT THESE FEATURES

- No honing. Will not chatter. Chrome-like finish.
- · Perfect alignment. Full bearing surface. Left and right spirals.
- 50 to 80 thousandths expansion.
   Cannot fall in slots or oil grooves.
- Extension pilots for line-up work.

REAMER CO. | WRITE FOR Chicago, III. | WRITE FOR CRICULAR WILL SHIP ON 30 DAY'S TRIAL

#### Three New Mazda Fluorescent Lamps

The addition of three new items to the growing line of Mazda fluorescent lamps is announced by the Westinghouse Lamp Division, Bloomfield, N. J. Daylight color in the 100-watt lamp is now available in addition to the present 100-watt Mazda F lamp in the 3500° The 14-watt Mazda F lamp, white. primarily used for train lighting, can also be obtained in the daylight color. It can be used to some extent in general and decorative lighting where the shorter bulb length is desired and in The new soft portable floor lamps. white color is now available in the 15watt 18" lamp.

**Heavy Duty Connectors** 

A new line of heavy duty plugs, receptacles and cord connectors for use with portable electrical equipment is announced. While this line has the same electrical rating and is approximately the same size as standard at-

tachment plugs and outlet receptacles, it embodies the heavy duty design and substantial construction features of larger plugs and receptacles for industrial use.



CLOSED TRADE < Plain Type

All hinges shown can be furnished with specia lurnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET.

AUTO MOULDING & MFG. CO.

2326 S. CANAL ST CHICAGO

Open Width %" to 6"
Gage Material .040 to .125
Pin Diameter .101 to %
Lengths to 120"

#### THE PRECISION UNIVERSAL TOOL HEAD



brings all adjustments under absolute microsteric control of the operator without stopping tool or machine. In Jig Borer, Milling Machine or Horizontal Boring Mill, it bores, faces, counterbores, turne outside diameters, mills flat surfaces and slots, under-cuts, recesses, back-faces and does an almost limitless range of "headache" jobs. Send for bulletins. Address all communications, inquiries and orders to

THE PRECISION TOOL COMPANY
P. O. BOX 155, BROOKLYN, NEW YORK
Cable Address: "Pretool-New York"
Tel: MAin 4-1064

All 2, 3, and 4 pole contact units are interchangeable, to permit using a wide variety of plug shells and receptacle housings to make any desired assembly combination. Contact units are reversible, for safety protection. The enclosed female contacts may be essembled in either plug shell or receptacle housing, depending upon which is connected to the live line side of This allows the use of the circuit. extension cords with cable connectors. and convenient receptacles mounted on portable equipment, without the hazard of exposed live contacts. Contact units are of molded bakelite

contact units are of moided bakelite with renewable self-aligning flat bronze contacts and side-wired binding screw terminals. Plugs cannot be inserted incorrectly, nor can they be inserted in any receptacle having a different number of poles, nor in conventional wall outlet receptacles. Polarity is maintained by unequal spacing of the contacts and a keyway in the contact

unit insulation.

Three and four pole contact units can be furnished with one pole grounded for installations requiring an equipment ground wire. Grounded contacts are extra long to insure making contact first and breaking contact last.

## CUT MANUFACTURING COSTS of SMALL PARTS WITH THIS Vertical Profiler & Milling Machine



Let us send you our latest bulletin No. 12 M, giving all the detailed specifications of this time and money saving machine. Modern in every detail — fast — convenient.

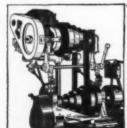
Designed for the manufacture of small parts requiring accurate interchangeability. Many new and exclusive features are incorporated in this machine.

Write TODAY

Morey Machinery Co., Inc. 410 Broome Street, New York, N. Y.

#### A New Vise Catalog

Desmond-Stephan Mfg., Urbana, O., announce a new Simplex Vise catalog. In addition to listing a complete line of Machinists and Combination Pipe Vises, it includes a line of Production, Welders', Filers', Drill Press and Milling Machine Vises. Vise jaw covers in brass and copper are also included.



## Give production a kick in the pants

Every man—every machine—must produce at full capacity. Unit drives boost output. Machines shackled to line shafting slow it up. Oust it. Install Remoo Drives on your shaft driven machines. Remoo Drives take any motor of reasonable size—new or USED. No need to buy new motors—or new machines. Remoo Products Corp., State St. at R. R., York, Pa

REMCO MOTOR DRIVES

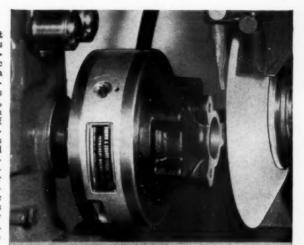
for LATHES, SHAPERS, DRILLS, MILLING MACHINES, etc.

#### Static

Scientific defeat of a mysterious "industrial bogeyman" - static electricity- which has caused a \$3,-000,000 annual loss in factory fires. menaced aviation safety, and set off explosions in gasoline tanks, has been achieved with a new method of compounding both rubber and synthetic rubber so that static discharges pass harmlessly through, A. E. Juve, Goodrich research expert. declared in a recent article in the "India Rubber World."

Already being applied in gasoline hose, airplane deicers and tires, surgical gloves, sheeting, tubing and anesthetic masks, heels, matting and flooring and in home washing machines and other electrical machines, the new compounds have "an electric re-

sistivity possibly as low as one-millionth that of ordinary rubber" and are now enabling the oil and aviation, coating and other industries, as well as hospitals and filling stations, to thwart the danger of explosions and fires caused by uncontrolled static electricity, Mr. Juve declared. New methods for pigmenting and mixing conductive ingredients with rubber and synthetic rubber are used in these products, he said.



NO HEATING — Work can be left on chuck overnight, or as long as desired, without damage to work or chuck.

#### BROWN & SHARPE MAGNETIC CHUCKS

PERMANENT MAGNET TYPE
No wires — No Heating — No Running Costs
— Ask for circular on both Rotary and Rectangular Models.



For sale only in the U. S. A. and its Torritories

BROWN & SHARPE MFG. CO., PROVIDENCE, R. I., U. S. A.

"Static charges may be developed in a number of ways. Primarily, friction between two insulating materials, or friction within an insulating liquid or gas, in itself, is required," Juve declared. He continued, "In factories, the uncontrolled discharge of static accumulations built up in belts, especially those operating on insulated pulleys, is largely blamed for an estimated annual reless of \$3,000,000, according to the National Fire Protection Association."

#### Foot-Operated Bench Vise

An unusual bench vise is offered by the Automatic Vise Sales Co., Los Angeles, Cal. This "automatic, quickacting" vise is controlled by the foot, leaving both hands free to handle the piece or pieces in the vise.

When not locked the movable jaw slides free and by a slight pressure of the hand or body moves easily to any position. The main clamping pedal gives sufficient pressure for general work; for greater pressure apply the small pedal just below the main pedal. The two side pedals are for releasing.



The jaws open 61/4". Three models are offered:—for mounting on the edge of a bench, a model with an extension placing it 12" away from the bench, and a field model mounted on a portable stand.

#### **Booklet on Uses of Files**

"A File for Every Purpose—Instructions for Use and Care" is the title of a 25-page booklet announced by the Nicholson File Co., Providence, R. I. This informative booket gives a re-

## OSLUND Universal Indicator



The only indicator with 3600 reading face. Scale is easily read in any position. Accurate and quick in any set-up. Readings can be taken without mirrors when indicator is used up-side-down or facing towards back of machine. Complete indicator farnished with case as illustrated above. PRICE, \$9.50.

Send for illustrated pamphlet.

OSLUND TOOL & DIE CO.

14 Sigourney St.,

Hartford, Conn.



## LIGHT ON THE JOB! WHERE LIGHT IS MOST IMPORTANT

Speed production, cut rejects, increase efficiency and morale by giving your workers adequate light en the job for better "seeing". Fostoria Localites solve the problem. Over one thousand ma-

problem. Over one thousand machine, bench, table and overhead models. Write for catalog No. 25, today.



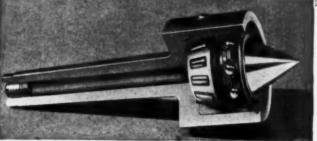
THE FOSTORIA PRESSED STEEL CORP. Fostoria, O.

IDEAL

"Triple Duty"

## LIVE CENTERS





FL — Female Insert with three raised lands. Capacity %\* to %\*. ("A" size).

F - Plain Female Insert. Capacity 3/8 to 3/4. ("A" size).

M - Male

## CUT PRODUCTION COSTS on Lathes, Grinders, Millers, Screw Machines, etc.

Three (3) Interchangeable Inserts Permit Use with All Kinds of Centered and Uncentered Work.

- · Timken Thrust Bearing.
- New Departure Radial Bearing.
- Precision Made All Parts Hardened and Ground.

**BALANCING WAYS** 

⑩到 "Universal" METAL ETCHER



- Permanently marks on steel, iron and
- on steel, iron and their alloys.

  • Compact, everything enclosed.
- Four etching heats.
  Ground clamp for large work.

THREE Other Models
Also Assilable.

 Simplify balancing crankshafts, pulleys, flywheels, etc.

DEAL

 Adjustable — no leveling or set-up required.

 Work carried on freeturning discs.



IDEAL COMMUTATOR DRESSER CO.

1441 PARK AVE., SYCAMORE, ILLINOIS

"Sales Offices In All Principal Cities"

In Canada: Irving Smith, Ltd., Montreal, Que.

markably complete outline of the types of files and their various uses in indus-

try and in the home.

A detailed account of the many processes which are necessary to make a modern hand file should prove interesting to anyone familiar with metalproblems. working The important question of the shape of file teeth is also referred to, with special emphasis on Nicholson's patented new design-"serrated" teeth.

This interesting booklet is a good source of practical information on the use of the hand file. Several pages are devoted to saw filing. Other subiects treated include drawfiling, lathe filing, precision filing, and tool sharpening.

#### Universal Milling Machine Attachments

A new bulletin describes the milling machine attachments made by Porter-Cable Machine Co., Syracuse, N. Y.

Many metal working plants are using such attachments for speeding up production, especially on awkward milling jobs that would otherwise require in-

tricate jigs and fixtures.

Porter-Cable has been manufacturing quite a complete line of universal milling machine attachments for many years, and will gladly give anyone interested in these attachments complete details on models for use on various milling machines.

#### For VIBRATION-PROOF **FASTENINGS**



on any mechanical or electrical equipment . . .

Resilient non-metallic locking collar automatically eliminates thread play and holds threads in constant pressure-contact.

ATALOG contains a graphic explanation of the Elastic Stop principle, presents test and application data, and lists the complete line of nuts. . Write for a copy.



**ELASTIC STOP NUT CORPORATION** 2325 VAUXHALL ROAD . UNION, NEW JERSEY





ARMSTRONG-BRAY & CO. "The Belt Lacing People" 315 N. Loomis St., Chgo. U.S.A.

WIREGRIP Belt Hooks -6 sizes of tough hooks conveniently carded. No waste, Makes smooth humpless flexible joint on all flat belts.

STEELGRIP Locing \_ 8 sizes, applied with a hammer. For all flat belts on tough drives. Prevents end fraying.

Here at one source are all belt lacing needs, de-pendable satisfactory products of guaranteed material and workmanship. Write for Catalog.

### TROYKE ROTARY TABLES

Accurate-Sturdy-Moderately Priced.



Made in 7 sizes from 9" to 25"

Ask your dealer or write us for new 1941 8-page catalog.

ALFRED A. TROYKE, 4422 Appleton St.,



OAKLEY, CINCINNATI, OHIO

#### **Explosions**

Explosions in industrial pressure storage vessels can cause property damage and even loss of life. Research is being carried on in an attempt to eliminate this danger.

Mr. Merl D. Creech, engineer, recently told the A. S. M. E. about successful first experiments making use of rupture disks to relieve harmlessly the explosion pressures. He said in part:

"In many industrial applications a pressure vessel is used for the storage of an explosive mixture of compressed air and some combustible vapor. Each of these installations represents a hazard to life and property. A common example is air receivers. Although compressed air is not in itself explosive.

t h e introduction of oil into the receiver either from a defective compressor or by faulty operation does create a condition responsible for explosions, resulting in great loss of life and much property damage every year.

"Even though these vessels are always provided with relief valves to safeguard them from overpressure, they are not protected from the very rapid pressure rise during a combustion explosion of their contents. Since the relief valve does not protect them and it is obviously impossible to prevent



## GITS BROS. MFG. Co.

1860 South Kilbourn Ave.

Chicago, Ill.

30 years of vil cup experience

an occasional accidental explosion, it seemed to be worth-while to investigate the ability of a rupture disk to relieve harmlessly the explosion pressure.

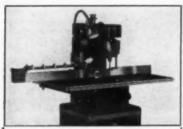
"The experimental data presented here are merely a first step toward the solution of this problem. The results thus far obtained do indicate that by using a higher factor of safety in designing the vessel together with a rupture disk of suitable size, every vessel containing an explosive combustible mixture can be protected."



#### ERICKSON STEEL CO.

80th & BESSEMER

CLEVELAND, OHIO



#### SHIFT INTO "HIGH" With Light on the Work

Wherever this Paper Drill is placed Vimcolight floods the operation with non-glare illumination. Challenge Machinery Co. of Grand Haven, Mich., install it as standard. For greater production, use VIMCOLIGHT! 20 years experience solving lighting problems. What's yours?

#### **Small Milling Machines**

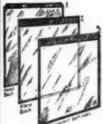
A new "No. 00 Rigidmil" is announced. This small milling machine has a ¾ h. p. spindle motor and is designed for the efficient milling of small parts. Two models are available, one with power feed, and the other with hand feed.



The power feed machine ilustrated has an hydraulically actuated table. Use of hydraulic feed makes possible a wide range of automatically controlled table cycles including two way cycles and skip feed. Climb or conventional milling can be done either separately or in combination.

The table has a maximum stroke of 8" and a rapid traverse rate of 400" per minute. Feed and rapid traverse strokes can be regulated (within maximum limit), to suit requirements of the job. This feature, combined with automatic table control is said to provide high production at a minimum of operator effort. Two feed ranges are available:-one from 1/2" to 37" per minute,

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#### WADE INSTRUMENT CO. 1422 E. 109th St., Cedar 4728, Cleveland, O.

#### MODEL NO. 16 "SPECIAL"

Constructed as per Specifications of U.S. Naval Aircraft Factories



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BUTTERFLY FILING and SAWING MACHINE

(Die Making Markins)

This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of

Battenty trade mark. machine is usually adopted in Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired. We also manufacture smaller models—Model D-10\* Table; Model No. L—12\* Table.

HARVEY MANUFACTURING CORP. 161 Grand St., New York Phone: CAnal 6-5170

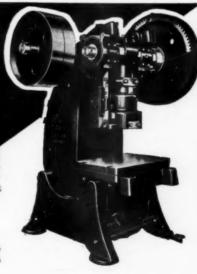
# FEDERAL "Built for Service" PRESSES

Rigidity and long life are outstanding characteristics of Federal Presses, yet they are precision built throughout. On the ram action, for example, the tolerance is only .0015\*.

Federal Built-for-Service Presses are all equipped with Timken roller bearings for smooth operation and lowest maintenance costs. Federals are safer in many ways—safety latch-spring, patented non-repeat clutch mechanism, etc.

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#### Champion Expanding Mandrels



14" to 614" Efficient-

Dependable-

Write for catalog

THE WESTERN TOOL & MFG. CO.

Springfield a Ohio

#### HART'S MILLING FIXTURES



These fixtures will make themselves popular and profitable in your shop. They are easily kept clean to receive the work and may be used in either horizontal or vertical position. Suitable to hold round, hexagonal, octagonal, or square stock, aligning the work with the machine. A very easy setup and fool proof, with a grip that holds the work on the bottom as well as on th back. Shipped in pairs, unless otherwise ordered. Made in 4 sizes—3/4\* to 4\*. We can also supply dividing heads to be used with the fixtures.

Write for descriptive circular. Kindly Mention the Blue Book

HART MACHINE CO.

26 Mather St., Dorchester, Boston, Mass. and the other from 11/4" to 66" per minute. Any desired feed rate within the range of the machine can be obtained by adjustment of a feed selector dial which furnishes a direct dial reading in inches per minute.

The manufacturer emphasizes the wide range of spindle speeds possible with the high ratio head. The ratio between the high and low speeds is 421/2 to 1.

Heads are available in two models-"A" with speeds from 57 to 2415 r.p.m., and "B" with speeds from 85 to 3600 r.p.m.

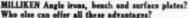
#### File Handle and Holder

An unusual file handle and holder is announced. It is made up of an arc-shaped surface file handle and a front-end holder. Both units are so designed and built that they will in no way interfere with surface filing. This is said to make a balanced assembly which does away with the old method of applying pressure on the serrations of the file with the finger tips.



Six sizes of handles and four of frontend holders permit the use of this assembly on nearly all common sizes and types of hand files.

#### HAVE YOU CONSIDERED



- I. MILLILOY A new semi-steel material minimum
- warpage—four times the wear. A choice of three types of finish.
- 3. A wide variety of sizes.
  4. An industrial standard for 30 years.
  5. Delivery out of stock.
  Write for our latest folder. It contains an authoritative and interesting story on the newest improvements in these basic production tools.

#### MILLIKEN MACHINE COMPANY

23 Prospect Place,

West Newton, Mass.

#### Atoms

The year 1940 was a fruitful one in the field of "atom smashing," as nucle a r physics is popularly called.

A new way of releasing the energy
of the uranium
atom was discovered by Westinghouse scientist Dr.
E. U. Condon and
his staff. They used
a form of light ray
instead of neutrons.

The researchers used gamma rays, which are energy radiations similar to light or X-rays, but much shorter and more penetrating. Neutrons are solid particles of matter extracted from the cores of atoms.

Gamma rays with an energy of 6,000,-000 electron volts we re obtained by shooting protons, atomic particles similar to neutrons but carrying a positive charge of electricity, at pieces of material containing fluorine.

The energy released when these gamma rays split uranium atoms was found to be the same as when neutrons were used. It amounted to 200,000,000 electron-volts— 30 to 100 times the energy expended in causing the splitting. In comparison, when a single atom of carbon in coal is burned in air to release its energy, only four electron volts of energy are released. If the process could be made self-maintaining, uranium would give 2,500,000 times as much power weight for weight as coal. But there is a long and difficult job ahead before we even



#### Send for your copy . . .

of this new Catalog, just off the press, which shows a complete new line of Ames Gauges and Dial Indicators.

B. C. AMES CO., Waltham, Mass., U.S.A.

know whether the process is practi-

cally applicable.

The Pittsburgh investigators also reported during the year that they had found the threshold or minimum energy of fast neutrons to be 360,000 electron - volts in order to effectively split uranium atoms and release their energy. Previously, physicists had believed that the minimum energy had to be nearly double this figure. Similar studies were made on the "threshold" energies in connection with such other elements as beryllium and thorium.

#### Illuminated Magnification

Magni-Master illumination is tended for precision and inspection It is said to duplicate ideal daylight conditions under which work may be done comfortably, eliminating eve-fatigue. Models are available in hand units, stand units, or fitted for attachment to special equipment. Each is equipped with ball joint attachments and slides which allow complete adjustability to any focus or position.



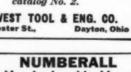
# Labor

Eliminate heavy lifting. Cut handling

costs. Table swivels and locks in any position. Can be varied 151/2" by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

Send TODAY for illustrated catalog No. 2.

MIDWEST TOOL & ENG. CO. 112 Webster St.,





## Numbering Machines

Automatic and Hand Operated

for stamping in Metal, Fibre, Plas-tics, etc. Do faster and better work than Single Steel Stamps. or Marking Metal Parts, Name Write for Catalog.

NUMBERALL STAMP & TOOL CO., Inc. Huguenot Park, - - Staten Island, N. Y.



The achromatic lens is corrected, assuring a flat, sharply defined field of view. Diameter of the lens is 35 mm., its power is 41/2X. The lens is fitted into a threaded casing and can be instantly adjusted to any desired focal position.

#### Stackbin Issues Catalog

A new catalog, No. 500, presents upto-date and informative details about the Stackbin System. Anybody interested in modern methods of handling and storage can study this interesting catalog with profit.

#### **KEYSEATERS**



Mill keyways in the run or on the ends of shafting already erected - save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

JOHN T. BURR & SON 429 Kent Ave. Brooklyn, N. Y.

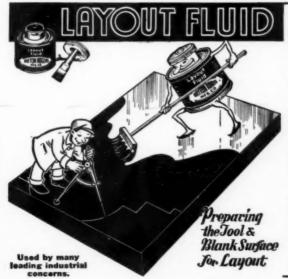
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Style D-E, Quick Change Tools



#### By Dayton Rogers

Better than the old copper sulphate method because the scribed lines have a pronounced contrast against the dark back ground – relieving eyestrain and allowing the workman to work accurately and easily to the desired layout. May be used to advantage on brass, aluminum, sainless steel, tin, copper, etc. Unnecessary to polish surface—simply wipe fairly clean and brush on — DRIES INSTANTLY.

Free sample if you request it on your business letterhead.

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Grinding Sanding
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Now get prompt delivery—from 2 to 5 days Standard Specification machines. Stow's increased facilities—for biggest output in history—meet today's demand from manufacturers everywhere for greater production speed up. Thousands of shops already use Stow—on hundreds of operations—for bigger output and lower costs.

Get the help of a Stow heavy-dutymachine for continuous production, or a Stow Junior model for inter-



mittent work. These proved machines are the result of Stow's 65 years of flexible shaft experience. Both assure you the latest mechanical developments... precision accuracy... exceptional ruggedness. That's why men who know demand Stow—it's an investment that keeps paying big returns year after year! Write for complete Stow catabag NOVI!

STOW MFG. CO., INC.

30 Shear St., Binghamton, New York Established since 1875 Inventors of Flexible Shafts

#### **Defense Program For Engineering Students**

Speaking on National Defense before engineering groups in Syracuse recently, William A. Hanley, President of The American Society of Mechanical Engineers, advocated graduation of the engineering classes of 1942 at least three months in advance of the regular date. Mr. Hanley said that 14,000 engineers will graduate from universities in the U.S. in 1941 but many more will be needed He suggested that the engineering schools continue throughout the summer months with intensive study so that the class of 1942 can be graduated in February of that year. He sees it as a patriotic duty that the universities and the class of 1942 cooperate to carry out such a program. According to his statement, one industrial concern alone is now planning to take on 1400 graduate engineers before July 1941. These conclusions have been reached after a visit in the last few days to New York, Philadelphia, Hartford, Worcester, Boston and Schenectady where industrial concerns coop-erating on the defense program have explained the great scarcity of young engineers for this most vital job.

#### Western Heat-Treaters

Reflecting the increasingly favorable outlook for manufacturers in iron and steel fields is the announcement by Abegg & Reinhold Co., Ltd., Los Angeles of an important addition to their plant. The new all-steel building 160' x 60' will provide space for increased heat-treating facilities. This concern is one of the oldest and largest commercial heat-treaters on the Pacific Coast and they number among their clients, leading aircraft manufacturers as well as those engaged in the general manufacture of heavy machinery.

The new facilities are expected to relieve the over-taxed production schedule of the present plant. The company experienced a record-breaking year in 1940 and have commitments for 1941 which made the present expansion imperative.

SAVES AN AVERAGE OF \$4.80 EACH HOUR IT'S USED



Inside and outside cuts on dies, shoes, templets and endless other jobs can be done in a small fraction of the time required by former methods. Saws, files and polishes. A highly developed, large capacity machine.

Write for literature.

HE TANNEWITZ WORKS GRAND RAPIDS - MICHIGA

#### he CRITERION Carbide Tool rinder

GREATER PRODUCTION CAPACITY

Provides positive rapid adjustment to meet the rigid requirements of production tool manufacturing. Built for continuous service. Adjustable coolant system. Large work tables instantly adjustable without wrenches or other tools. One-third H.P. balanced precision bearing motor completely enclosed and radially mounted in rubber. Standard equipment. One 60 and one 100 grit 7" dia steel backed silicon carbide wheels. Ideal for metal bonded or Resipoid bonded diamond wheels.





#### For AIRCRAFT



GREENERD

The Originators of the Arbor Press 941

PRECISION WORK IN REARMAMENT

65 Standard Styles and Sizes. Manually operated presses 1/4 to 35 tons pressure. Motor driven hydraulic presses 11/2 to 30 tons pressure.

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Est. 1883

NEW HAMPSHIRE



#### YOU NEED THIS RACK IN YOUR TOOL ROOM

4 arms, 51° high, stacks 10,000 lbs. flat or round stock, 5 arms 57° high, 12,000 lbs. Less weight capacity for tubes or pipes. 3 stands for 20° leagths; 2 for 12° or shorter. Use against wall or back to back in center of room. Cost is small, value big.

Write for circular and prices.

WM. S. YOHE SUPPLY CO.

#### Hartford Bench Taper Gage



This gage has been developed to not only meet tool-room requirements, but manufacturing requirements.

It is made in a most substantial manner of the best materials. The gage piaire are hardened and ground. In operation the gage eats on a bench convenient to the workman. It is adjusted to the height of his eyes, and placed so that he looks toward the light through the gage. The gage plates are set to a master plug gage. It is found much more accurate and rapid to operate than a ring gage.

Height to center line of gage: greatest, 3014 in.; least, 2314 in.; weight, 23 lbs.

Capacity ... From nothing to No. 14 Brown & Sharpe taper.

Built and sold by

The Hartford Special Machinery Co.

#### Welding Alloys and Fluxes

Park Sales Co., 3 Park Place, New York City, who introduced on the American market, a new welding material made in Switzerland, has found it impossible to import this product any longer. They have started to make a similar product in the U.S. under the name of Weldoloy and it is being distributed under the firm name of Weldoloy Mfg. Co. (a division of the Park Sales Co.)

This material is available in a wide variety of alloys and fluxes for oxyacetylene welding and, according to the manufacturer, enables welding operations to be performed at unusually low temperatures. Because of this feature, overheating and subsequent warping of welded parts are said to be avoided and stresses eliminated. Alloys are supplied in rod form, and fluxes in powder or paste form.

#### **CUTS GRINDING COSTS**



1/2-3/4-and MORE

HEAVY DUTY

3 Phase 60 Cycle No Broshes

GASTON POWER TOOLS 2655 W. 95th St., Evergreen Pk. III.

#### DON'T CUSS when your taps break off ...



No longer necessary to anneal the broken tap. The steel fingers of the Extractor, inserted in the flutes of the broken tap, remove the broken piece intact. Made in all standard sizes from No. 4 to 1½2. 2, 3, and 4 flute styles.

Will you give it a 30 days free trial?

Ask for Folder 131.

THE WALTON CO., 95 Allyn St., Hartford, Conn.

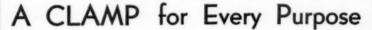
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a stopping place modern in every detail, yet maintaining a friendly atmosphere and hearty hospitality e preferred by experienced travelers o dining room o garage adjacent o rooms from \$1.50 . with bath from \$2.50

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Forged Steel **Quick Acting** Deep Reach Welders



Sizes Available: 34" to 10' opening

1/2" to 16" deep

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The Cincinnati Tool Co.,

1945 WAVERLY AVE., CINCINNATI, OHIO

#### Toggle Clamp for Aircraft Work

Detroit Stamping Co., 347 Midland Ave., Detroit. Mich., announces the addition of a new light weight model to its already large line of toggle clamps.

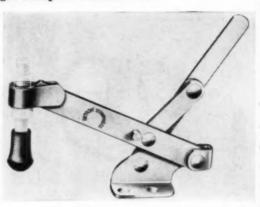
Because of its reduced size-6" x 6" x 1-3/16" overall - this clamp is said to be especially suited for production work in the aircraft

industry.

Known as the "De-Sta-Co Model No. 200 Junior, Special Light Duty," it has a clamping ratio of 33 to 1 and is intended for holding parts during welding, drilling, machining, assembly and other aircraft production

operations. The clamp is made of cold drawn, tough steel. It is bright cadmium plated, and weighs only 9-1/4

ounces.



The manufacturer emphasizes that the parts of this clamp are finely machined to assure free working, yet design is' such as to avoid looseness at bearing points.

## AIR MAGILO

Manufacturers of Resistance Welders-Foot, Motor, Air and Hydraulic operated.

Standard and for specific applications with and without electric timing control.

Bench type filing and sawing machines and abrasive band finishing machines.

ARMGLO COMPANY

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5 types.



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CLAY & OAKLAND STREETS BROOKLYN, N. Y.

# BALDOR BALL BEARING GRINDERS

FOR
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## Xtra Heavy AND Excess H. P.

A powerful, heavy-duty 10° Grinder. Heavier and more H. P. than usual for its wheel size. 1½ h. p., 3-phase motor; 220 volts, 60 cy., 1725 r. pm. 10° xl² wheels. NET WEIGHT, bench type, 155 lbs. (Also available in pedestal type) 1-YEAR GUARANTEE.

No. 101 — Bench Type — \$84.00

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#### Correcting Piston Collapse

"Pulled" pistons can be expanded to proper size by several methods, such as the application of piston skirt expanders or a peening process. There is a



third method known as "Koetherizing," which might, technically, come under the peening classification but which is really different.

In a peening process, hammer blows

are used, but in the Koether process the force exerted on the inside of the piston skirt comes from air pressure and a continuous rain of steel shot which the high pressure air drives against the inside of the piston skirt.

It is explained that the application of the shot hardens the inside surface of the skirt, creating sufficient tension in the metal to cause it to expand. Tension so developed is said to be unaffected by engine operating temperatures, removing the danger of future collapse.

In this process, the piston is anchored on a small oscillating table inside a patented "Koetherizing" machine. The shot is sprayed in such a way that it will not touch the piston pin bosses or struts. The manufacturer declares that the expansion can be accurately predicted and controlled. Charts are offered showing the air pressure and time required to produce any desired degree of expansion on any type of aluminum piston, within a tolerance of .0005".





#### T. H. L. FRONT LEVER

#### PUNCH BENCH

Built for hard, tough work - die can-

NICE WITH ONE \$37.00

not lose alignment with punch - all parts interchangeable.

Capacity -1/2" holes through 3/16" steel; 13/32" through 1/4" steel. Can also be made for holes up to 7/8" in thinner metal. Stock punches and dies available from 1/16 to 1/2\*by64ths.Weight. 70 lbs.

T. H. Lewthwaite Machine Co.

(Est. 1890) 311 E. 47th St

## New Britain NIVERSAL VISE

Swivels 360 degrees horizontally, 100 degrees vertically, to give any angle or com-



NEW BRITAIN TOOL & MFG. CO. NEW BRITAIN, CONN., U. S. A.



#### PRE-DETERMINED DRODUCTIMETERS

Rotary style Model 4-R-7 shown. Available in single or double deck, both rotary and stroke styles.

Speed.

SHAFT TURNS AT RATE OF 2,000 COUNTS PER MINUTE

...and Adaptability

To meet increasing demands of industry it's essential today to have production machines record out-put with the greatest possible efficiency. Write for full details on how Predetermined Counters speed up production and eliminate loss.

#### DURANT MANUFACTURING COMPANY

1928 N. Buffum Street, Milwaukee, Wis.

180 Eddy Street, Providence, R. I.

#### MOTORIZE



# with MODERN Motor Drives ATTENTION Plant Managers and

Uncle Sam's defense program has made most of us realize the need for increased production in the machine shop. The basic and best way to stop loss of time, power and production in the average machine shop is to elliminate the line shaft. This can be done quickly and cheaply at great savings in time and money with Individual Modern Motor Drives for all types of machinery.

Superintendents

Individual Modern Motor Drives effect a substantial saving in the cost of machine operation and at the same time make it possible for you to get practically the same production out of your old machines as you would get with new machinery.

Modern Drives create a flexible condition in the machine shop so that when the type of work changes the machinery can be rearranged quickly and at the least expense.

Get in step with faster, better and cheaper production in your plant,

Machinery Dealers - Write for Our Special Proposition. Address your inquiries regarding Individual Modern Motor Drives to

Quality Hardware & Machine Corp. 5833 Ravenswood Ave., Chicago, Ill.

#### **Ahlberg Bearing Cabinet**

A compact and durable steel cabinet with swing cover provides neat storage and display space for a selected stock of Ahlberg ED Light-Duty Ball Bearing Pillow Blocks. Two popular sizes are mounted on the cabinet base to demonstrate the trim design and easy action of these economy anti-friction units which are protected by no-drag labyrinth seals of Neoprene. A pocket on the cover holds a supply of folders which give all sizes and prices. Details are available from Ahlberg Bearing Co., 3046 West 47th St., Chicago, III.

#### Walker-Turner Radial Drill

Walker-Turner announces a new low-cost radial drill for light duty operations.

It performs such operations as drilling, tapping, routing and light profiling efficiently and is being used in the aircraft industry for stack-drilling sheets, spars, etc., by tool makers for drilling in jigs and fixtures and for pattern making; and in other industrial plants for a wide variety of operations.

The drill head is mounted on a heavy cast-iron ram which rides back and forth in a supporting "cradle" on eight ball bearings.

Capacity is unusually large, drilling to the center of a 62" circle. Ram travel is 18". Maximum distance of chuck to table is 13½". Vertical movement of drill head is 8½" and spindle travel is 3-¾". Capacity of the Jacobs Chuck is ½". Height overall is 72", width 31", and depth front to back is 58". Shipping weight 450 lbs.

#### MODERNIZE PRESENT EQUIPMENT



Russell Boring Bar bores %6° to 12° dia. with boring axis parallel to shank axis. One compact tool, with micrometer adjustment.

RUSSELL BORING BAR CO.

#### YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Viae Na.	Width of	Opens	Weight	
	Jaw, Inches	Inches	Pounds	
1D	31/2	312	121/2	

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY

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Individually driven machine tools are practically immune from various breakdowns which can put entire lines of shaft

driven machinery out of commission.

4 and 8 Speed models are now stocked for immediate delivery. So BE WISE... MOTORIZE with FlexoiD.

Modernize your old equipment with FlexoiD SPeed Control Units.

These units convert every type and size of shaft driven machines to individual motor drives, which means added flexibility and economy.

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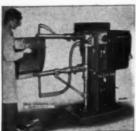
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Butt Welders to weld from .010" to 1/3" dia. metal. We make all kinds of Standard & Special TRANSFORMERS. A. C. ARC WELDERS-100 to 400 Amps. LARGE or SMALL QUANTITY CONTRACT SPOT WELDING.

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CHAS. EISLER EISLER ENGINEERING CO. 762 So. 13 St. near Avon Ave., Newark, N. J.

#### Tool Room Machine with Thread **Cutting Lathe**

The Hannifin No. 10 Tool Room Machine is now available with a precision thread cutting lathe featuring power longitudinal feed of the compound slide.



This tool room machine has been described recently in the Machine Tool BLUE BOOK. It is a general purpose unit combining lathe, sensitive drill press, horizontal milling machine, and vertical milling machine. The thread cutting lathe now offered employs a semi - steel bed of special rectangular section, mounted on a heavy base.

The compound slide is equipped with quick change gear box giving 45 thread pitches from 4 to 120, and 63 feed changes from 250" to .0021".

#### Machine Tool Forum

The 1941 Machine Tool Electrification Forum will be held at East Pittsburgh, Pa., April 14-16 inclusive, according to plans announced by Westinghouse Electric & Mfg. Co., sponsors of this annual event.

## **CUT METALS WITHOUT DISTORTION!**

The unequalled Beverly Throatless Shear cuts all metals flatly! Easy to operate. Cut any angle, curve, straight line with hair-line edge accuracy! This precision-built shear is made of the finest steels—will last a lifetime. Try this inexpensive PROFITABLE Shear today!



Made in 3 Sizes

No. 1—cuts 14 gauge—wt. 16½ lbs. No. 2—cuts 10 gauge — wt. 33 lbs. No. 3—cuts 3/16 inch —wt. 55 lbs.

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Or see your jobber!

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#### DRILLMASTER RADIAL DRILL

Economical in operating and first cost, this floor type, heavy duty, precicion-made, well-balanced Radial offers many features that merit your careful consideration. Drilling to the center of a 36° circle, No. 2 Morse Taper and heavy duty ½ HP ball bearing motor. The full floating, ball bearing spindle assures free and sensitive operation at all speeds.

Send TODAY for bulletin giving full details.

Wm. C. Johnson & Sons Machinery Company St. Louis, Missouri This will be the sixth meeting for the Machine Tool Electrification Forum, which has become an established event for discussion of mutual problems between machine tool builders and electrical engineers. Machine tool delegates, members of the Machine Tool Division of the National Defense Advisory Committee and Westinghouse representatives will discuss production requirements of the current emergency program.

The machine tool industry sent 138 representatives to the 1940 meeting; and present advance reservations in-

dicate a record crowd.

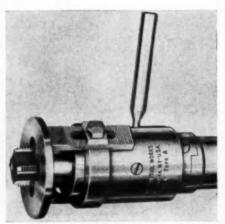
#### Collapsible Taps

Bottom hole tapping with standard chasers is one of the features of the new line of Modern Collapsible Taps to be exhibited in Booth 348. The tap is made with a one piece body which has a solid end. Due to this construction, no end plate or cap is required and regular chasers extend beyond the tap body permitting close to bottom tapping.

This design also is said to add to the rigidity and strength of the tap as chaser slots cannot spread and chasers are securely and accurately held in position. Collapsing is positive and always at the same point, being effected by an adjustable hardened steel trip plate coming in contact with the work, which causes the chasers to collapse quickly, leaving the threads clean and unmutilated.

Chasers in this new tap are set in on an angle and can be easily removed by merely taking out one screw. Provision is made for adjusting tap to cut "large" or "small" threads.

The Stationary Type Tap is fitted with a handle for resetting after col-



lapsing. The Rotary Type has a sleeve for this purpose. In this way, the Stationary Type can be converted easily to the Rotary Type by removing the handle and replacing the sleeve. Taps are regularly made in 12 sizes from 13/16" diameter to 3-¼" with each size having a liberal capacity range.



#### GRINDERS for PLANERS

VERTICAL SPINDLE GRINDERS FOR PLANER OR BORING MILL
14, H.P. to 10 H.P. 3,600 1,200 or 1,200 R.P.M. With Vertical or Horizontal Feed, both Feeds, or without Feed, Mounting Pad to suit.

WRITE FOR BULLETIN 17A

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Portable Electric Drills, Grinders, Blowers, Grinders, Tool Post, Snagging, Disc, Ring Wheel, etc., Buffing and Polishing Machines, 1/2 H.P. to 25 H.P.

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#### UNITED STATES 4-SPEED SNAGGING GRINDER

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Speed change by hand lever. Dustproof bearings. Chrome manganese steel grinding wheel spindle. Adjustable wheel guards. Electrical interlock. Write for catalog.



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WRITE FOR BULLETINS.

TRICO FUSE MFG. CO Milwaukee Wisconsin

#### Gear Cutting and Checking Equipment

The latest type lead and involute checkers will be featured at Booth 138. It is expected that an entirely new development in gear checking will be ready for demonstration for the first time at this exhibit. The line of Michigan cutting tools will also be displayed.

Cone Drive Worm Gears, including a Cone Drive Speed Reducer will be shown in operation. These gears have become particularly important for naval and aircraft work due to their extremely high load capacity and light weight per horsepower. Precision type and master gears will also be displayed.

#### Micromatic Honing

Of special interest in Booth 108 will be a new Automatic Microsize Control Unit, which obtains accurate sizing in high production for the final finish processing of bores. uniformly within limits of 0.0002" to 0.0005", reducing the tolerance range and number of selective fits required in assembly. A final surface finish from 3 to 5 micro-inches, r.m.s, is obtained on piston pin holes, cast iron valve guides and other parts.

#### **Toggle Clamping Devices**

A complete line of toggle-action clamping tools will be displayed in Booth 251. Knu-Vise clamps are designed for holding partial assemblies, sheet metal components, etc., during such processing operations as drilling, riveting and welding.



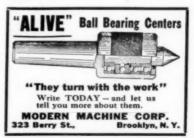
The clamps also are available for use as parts of many types of fixtures.



"The Belt Lacing People" 315 N. Loomis St., Chicago Every shop should have one of these universal pullers that pull wheels, pulleys, gears, shims, and bushings. Handle the large wheels no matter how far from end of shaft. Have close grip hooks for small motor pulleys. 2 sizes 3 ton or 12 ton capacity.

Chains proof tested.

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Please limit your choice to the ten items in which you are most interested.

Abrasive, cloth, paper Acoustic Booths Adapters, adjust. Alloys Angle Plates Arbors & Mandrels

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power Bending Machines, anale iron

Bending Machines, Hydro Bending Machines, pipe

Bending Rolls
Blow Torches Blower Systems Blowers Blueprint Machy. Bolt & Nut Machy. Boring, drill. Mchy. Boring Heads
Boring & Turn.Mills
Boring Tools

Brakes, hand pwr. Broaches Broaching Machs.

Buffing & Polishing Machines

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Counterbores Countersinks Counting devices Couplings

Cranes Cut-off machines Cutter grinders

Cutters Cutters, milling Cutting Lubricants Cylinders, air Cylinders, hydraul.

]Demagnetizers Diamonds Diamond Tools Die casting mchs.
Die Cushions

Die Duplicating machines Die Filers TDie Heads Die Holders

Die Making Machs. TDie Sets Die Sinking Mchs. Die Stocks
Dies, hole punch.
Dies, thrd, rolling rolling Dividing Heads
Dowel Pins, steel
Drafting Machines

Drawers, bench Drawing Instru. Drawing & Tracing Paper Dressers Drill grinders

Drilling Heads Drills, auton automatic Drills, column type Drills, multi. spdl. Drills, portable Drills, radial

Drills, sensitive Drills, wall type Drives, mach. tool Drives, variable Duplicating Attach.

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Etchers, electric Facers, spot Feed Fingers Files Files, rotary

Filing Machines Flangers Flexible Shaft Ea. Floating Holders Forges

Forming Machines Furnaces, heat treating, Electrons, heat Electric Furnaces, treat., oil or gas

□Gage Blocks □Gages □Gages, dial Gages, plug Gages, pre Gear Bores pressure Gear Cutting Mch.
Gear Testing Mch. Gears Generators

Goggles Grinders, abrasive belt

Grinders, benchfloor

Grinders, carbide tool Grinders, cutter &

tool Grinders, disc Grinders, electric

Grinders. flex, shf. Grinders, hand Grinders, oscillat'g Grinders, portable

Gir Grinders, precision Grinders, profile Grinders, snagging Grinders, tap Grinders, tool post Grinding, cents less, (contract) center-

Grinding Mch., belt Grinding Machines, universal Wheels Grinding Gun Making Mchs.

Hack Saw Blades Hammers, port., el. Hammers, soft Hobbing Machines Hobs **THoists** Hole Cutters Honing Mch.

Index Fixtures Jig Borers □ligs & Fixtures

Hose, metallic

Hydraulic Machin-ery and Tools

Keyseaters Keyway Cutters
Knife Grinders
Knurling Tools

Lapping Compounds Lapping Machines Plates Lapping Lathe Dogs Lathe Grinders Lathe live centers Lathes, armature TLathes, auto.

Continued on following page

□Lathes, bench □Lathes, engine	□Presses, forming □Presses, hydraulic	Shears, power Shears, rotary	☐Transmission, var. speed
□Lathes, extension bed and gap □Lathes, polishing &	Presses, power Presses, punch Presses, percus.	☐Shears, squaring ☐Shears, throatless ☐Sheave wheels	Trucks Tumbling Barrels Turrets, tool post
buffing	Presses, toggle	Sheet Metal Machinery	
Lathes, speed Lathes, spinning Lathes, soolroom	Pullers, heavy duty Pulleys Pumps, centrifugal	□Shelving steel □Shims and Shim Stock	Universal Joints
Lathes, turret	Pumps, coolant, lu- bricant & oil	□Shop lights . □Sleeves	□Valves, air □Valves, foot, sole- noid, pilot
Clighting Equipment  Ment  Lubricating systs.	Pumps, hydraulic Punch Press Feeds Punch Press Guards	☐Slotting machines ☐Speed Reducers ☐Spring coiling and	□Valves, hydraulic □Vises, bench
Machine Tool	Punches, hand,	forming machy.    Sprockets	□Vises, machine □Vises, machinists' bench
Magnetic chuck controls	Punches, multiple Punches & shears Punching Tools	□Stampings □Steel □Steel, black finish	□Vises, pipe □Vises, planer & sh. □Vises, universal
Marking machines	Pyrometers	□Steel Stamps □Storage Racks and Bins	□Washers
Micrometers Milling attach. Milling Machines	Racks, bar stock Reamer Holders Reamers	☐Straightening Mchy. ☐Stud Setters ☐Superfinishing	□Welders, arc □Welders, engine driven
Milling Mch., bch. Milling Mch., hand Milling Machines,	Reamers, air drill Reels, stock Rivets	Surface Plates	□Welders, snorm □Welders, spot □Welders, tube
turret   Mills, adjustable   hollow	Riveting Machines Routing Machines	☐Tables, elevating ☐Tables, rotary ☐Tap Extractors	Welding Accessories Welding controls
☐Molybdenum ☐Motors ☐Motor drives	□Sanders □Saw Sharpeners □Saws, band	Tap Holders Tapping Machinery Tapping Machines,	□Welding rods □Wire Forming Machines
Nibbling Machines Numbering Machs.	Saws, hack Saws, hole Saws, metal cut.	portable   Taps   Testing Machines	Wire Straightening Machines  Wire-Working
Oil and grease seals	Scrapers Screw Mch., auto.	Thread Grind. Mch.	Machinery  Wrenches
Oil groovers	Screw Mch., hand Screw Machine Tools	Threading Mchs. Toggle Clamps Toggle Pliers	************
□Parallels □Pillow Blocks □Pipe, cutting and	Screws, cap, set, saf. set & mach.  Screws, Mch. & pl.	Tool Bits Tool Holders Tool Salvage	***************************************
threading mchs.  Planers	Screws, recessed head	Tools, carbide	***************************************
□Plating, chrome □Press Brakes □Presses, arbor	□Screws, transfer □Shafts, flexible □Shapers	☐Tools, cutting-off☐Tools, filing☐Tools, lathe & plan.	***************************************
Presses, bench Presses, broaching Presses, foot	□Shapers, bench □Shapers, vertical □Shears, hand	☐Tools, machinists' ☐Tools, pneumatic ☐Tote Pans	***************************************
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#### **Screw Machine Cut-Off Tools**

The Empire Tool Co., 8790 Grinnell Avenue, Detroit, is now manufacturing a new holder to accommodate the Luers patented cutting-off blade for use



on B. & S. automatic wire feed and hand screw machines as well as other automatic and hand screw machines of approximately %" capacity and under.

This new holder permits blade adjustment for center height, with but little of the blade protruding. It has all the rigidity of a forged tool.

Only one holder is required for operation in either front or back position, with spindle running either forward or reverse.

Illustrated literature describing the Luers blade and various types of holders is available.

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Liquid form ready for immediate use! Quick drying\_non-rubbing, a scribe shows a clear distinct line without chipping or scraping off. Tamme Blue Chalk for checking leaks in castings. Write for FREE SAMPLE!

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Used in making sun glasses. Note that 'clearance' is provided when sawed with a DoAll precision band saw blade. Die is smaller at top than bottom — eliminating need for filing.



#### Forgings - Aeroplane Parts

At Brown Mfg. Co., New York, the rings at left were made on the DoAll Contour Machine with DoAll band saws in less than 2 hours each, 1 blade being used for 2 pieces. Material is very



hard special alloy 2; thick, 17° o. d., 14° i. d. Formerly ittook 14 hours and 5 saw blades to split one forging.

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Write directly to those offering the machine for sale, for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, Chicago, making known your wants on either new or used machinery and the publisher will gladly pass them along to the advertisers.

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21" Gisholt, 3\footnote{1}' hollow spindle. Bardons & Oliver No. 2.4, 7.
Steinle 24", Universal, 4\footnote{2}' H.S., M.D. Pratt & Whitney 2\footnote{1}:2\footnote{2}' grid. head. s.p.d. Millers, Brown & Sharpe No. 12 Production. Millers, Brown & Sharpe No. 13B Production, Miller, Cleveland No. 1 plain, s.p.d. Miller, Missakes No. 3\footnote{2}' ke Edund Type B Production, Miller, Cleveland No. 1 plain, s.p.d. Shaper, 24" Gould & Eberhardt,

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LATHES 18"x10' Mueller q. c. cone dr. 20"x10' Sidney q. c. cone dr. 22"x12' American q. c. cone dr. 28"x12' Bridgeford q. c. cone dr. 30"x16' American loose change. 36"x16' Pittsburgh I. c. dbl back gr. 36"x16' Boye Emmes atd. chge. cone dr. DRILLS 4' Mueller radial s. p. drive. 5' Fordick radial s. p. drive.

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# Drill, radial, 4' Western plain, Lathe, 16"x8' American quick change gen. Shaper, 18" Steptoe single geared. Shaper, 16" Ohio single geared.

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Boring mill, horizontal, ?" bar.
Boring mill, star Rogers, vertical, s.p.d.
Drills, radial, 4" Dress, 3" American.
Gear houbers 24" Rhenania; 18" Schuchardt-Schutte.
Lathes, 35" 344 Nicholson-Waterman, geared faceplate
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Walcott, q.c., t.a., 24" xl6" Whitcomb Blaisdell, q.
c.g., t.a., 16"x6" Walcott, 13 speed geared head, 22" x
12" Monarch 3 speed helical gd. hd., others.
Cyseaters, No. 1 and No. 2 Baker.
Cyseaters, No. 1 and No. 2 Baker.

Squaring shear, 19'xg" cap. Sonntag ''all steel'' 6" gap-ALSO MANY OTHER TOOLS.

#### Siegman Machinery Co., Inc.

#### 561 W. Washington Blvd., Chicago, Ill.

561 W. Washington Blvd., Chicago, Ille Bandsaw, Marvel No. 8, 18x18, m. d., b. b. Chucking machine. 4 spdi. Gridley model H. 44" m.d. Grinder, Greenfield hydraulic, No. 1—8"x18". Grinder, Greenfield hydraulic, No. 1—8"x18". Grinder, Kriett internal. Grinder, Kriett internal. Grinder, Norton 12x36, motor drive, cylinder. Grinder, Norton 12x36, motor drive, cylinder. Grinder, tool & cutter, Cincinnati No. 1. Grinder, tool & cutter, Wilmarth & Morman, No. 1. Lathe, N. B. P. 48"x18"1. c. g. double b.g. Lathe, 24"x12" Schumacher-Boye, 1. c. g. Lathe, turret, Acme 2" hole in spindle. Press, hydraulic, 15" ran, 778" day, 29x30. Press, punch, Massillon No. 7, 160 ton 6" stroke, b. gd. Press, punch, Bliss Cons. No. 7, 4" stroke, b. g. m.d. Profiler, single spindle, No. 6 Garvin Thread cutter, Coulter auto. 6" g. h. 4"x24" s.p.d. Thread generator, Fellows 4"x13" capacity.

Please send us your inquiries.

#### FOR SALE BY

#### Bleser Machinery Company 209 N. Sixteenth St., - Springfield, Ill.

Drill presses, 20" to 34". Lathe, 21"x8' LeBlond, q.c., r.b., 32". Planer, 24"x24"x4' Pond. Shaper, 32" American. Slotter, 12" Bement, 30" rot, table.

#### B. D. Brooks Co., Inc. 119 Broad St. Boston, Mass.

Sheet metal working machinery, hand and power.
All types of new and reconditioned equipment. Apron brakes, press brakes, shears, folders. Bending rolls, corrugating rolls, forming rolls, Punches, beaders, rotary machines, stakes, etc.

#### Foster Machinery Co. 3982 Bluestone Rd. Cleveland, O.

Buffer, 3 h.p. 3400 r.p.m., 220 volt. Bulldozer, Williams & White No. 4, double end. Bulldozer, Williams & White, No. 23. Bulldozer, Williams & White, No. 23.
Compressor, tank & 3 h.p. motor unit.
Drill, Footburt, 2" in steel.
Drill, realid, 34" Canedy-Otto.
Drill press, 28" Barnes, sliding head,
Forging roll, No. O.C. Ajax.
Grinder, 10"330" Landis (universal),
Grinder, No. 69, Heald,
Miller, vertical S. D. Becker, 40" rotary table.
Punch, horizontal Cleveland, Style "T" motor drive.
Punch, Long & Alstatter, 38" throat, 14" cap.arch jaw.
motor drive. motor drive Sander, disc, flexible shaft, Saw, 8" Newton, cold. Saw sharpener, 11S Cochrane & Bly. Welder, 3" butt.

#### Joseph Hyman & Sons, Tioga and Almond Sts., Philadelphia, Pa.

WORLD'S LARGEST STOCK POWER PRESSES

No. 5C Bliss, double crank, tie rod, 54", crank 5"—5\frac{1}{2}".

No. 5 Bliss, double crank tie rod, 36" \$" \$\frac{1}{2}" \$\frac{1}{2}" \$\frac{1}{2}"\$.

No. 52 E Niagara, gap, grd., double crank, 72".

No. 52 66 Ferracute, dul. crank 124", crank 7\frac{1}{2}" -9". (2)

No. 195 Consolidated gap, d. c.

STG 193 Ferracute gap, double crank, gap.

No. 393, 91C, 90D, Toled double crank presses,

No. 2119 Hamilton, straight side, tie rod, crk. 13"—19"

No. 748 Bliss graced straight side, Nos. 74g, Bliss geared, straight side. Nos. 54, 55, 55g, 56 Toledo, geared straight side. No. 3gB Blisstoggle press. No. 380 nivastoggrepress. No. 1647 Toledo toggle press. Nos. PAS Ferracute & 13 Toledo horning. No. 254 Biss-Consol. horning. No. 562 Toledo, 239 ton knuckle joint. coining. 75 ton EG 51 Ferracute; 460 ton Waterbury-Farrel, 78 ton EG 81 Ferracute; 400 ton Waterbury-Farrel, knuckle joint, coining.
230 ton Waterbury F, coining.
125 ton & 150 ton Waterbury Farrel coining.
136 ton EG 82 Ferracute.
186 is real forming machine, 5 pairs rolls for stock up to 28" wide, 4" bearings, weight 25,000 lbs.
5quaring shears, various sizes.

Rebuilt and Guaranteed.

#### FOR SALE BY

#### C. C. Howarth Machinery Co. 1440-44 Franklin St., - Detroit, Mich.

MODERN MCHS. AT ATTRACTIVE PRICES. Drill, radial, 3' American. Grinder, 6x32 Norton external. Grinder, \*\*\*32. Norton external. Lathes, 14", (3). Milling machine, No. 12 Rockford plain, div. head. Milling machine, Garvin, dividing head. Press, 30S Bliss, 6" stroke. Shapers, 16", (2)

Your inspection invited.

#### B B Machinery & Tool Company 503 Locust Street Trafficway, Kansas City, Missouri.

Drill, radial 41' Dreses. Gear cutter, Gleason bevel. Gear hobber, 18-H. athes and planers. Miller, No. 3 LeBlond universal. Shapers, 16", 20" and 24".

#### Failor-Strafer Machinery Co. 132 Liberty St., - New York, N. Y.

Boring mill, 42" Bullard vert., 2 hds. 3 jaw chuck table. Drill, radial, Amer. 3" sens., tapping attachment. Drill, Henry & Wright b. b., 4 spindle, 1" cap. Drill, 32" Reed Prentice, sl. hd. tapping attach., m. d. Drill, 32" Reed Prentice, sl. Mt. tapping attach., m. d. Gas furnace, No 4 American, door opening 8"x14". Grinder, Grand Rapida Drill Grinder, a. e., m.d. Grinder, No. 3 Brown & Sharpe cutter & reamer. Grinder, No. 3 Brown & Sharpe cutter & reamer. Grinder, No. 3 Brown & Sharpe cutter & reamer. Grinder, Draw Lander, 18"x14" Lander, 18"x14" Davis, Lathe, 34"x14" Davis, m. d., 33"x14" Davis, Lathe, 34"x14" Lander, 43"x14" Davis, p. d., taper, Lathe, 24"x11" American, triple geared, taper att. Lathe, 25"x11" American, triple geared, taper att. Lathe, 25"x11" American, triple geared, taper attach. Lathe, 25"x10" Bridgeford, 3 step cone, taper attach. Lathe, turret, No. 3 Acme uni. b. & c. equip., g. h. Lathe, turret, No. 3 Acme uni. b. & c. equip., g. h. Lathe, turret, No. 3 Acme uni. b. & c. equip., g. h. Miller, No. 2 Shields, plain, high power, hvy. duty. Miller, No. 2 Kempsmith, plain, with dividing head. Miller, 48" Newton continuous arrd., 2 spide., m. d. Profiler, No. 12 Pratt & Whitney, 2 spindle. Saw. Peerless power hack saw. Saw, Peerless power hack saw. Shear, 8"x8"x12" H.&. J. dbl. angle on turntable, m.d.

#### Russell Machine Co. 438 Oliver Bldg. Pittsburgh, Pa.

Pittsburgh, P
Boring machine, Barrett 8" dia. bar, b.d.
Boring mill, horiz., 64" bar, Niles, floor type.
Boring mill, horiz., 64" bar, Niles, floor type.
Boring mill, 16" Niles vertical.
Gear cutter, apur, 84" Niewark, m.d.
Gear planers, bevel, 54" Gleason m.d., (2),
Hammer, 300 lb. Bradley, uprightstrap,
Hammer, 1500 lb. Bliss board drop.
Hammer, 2500 lb. dbl. frame, Chambersburg steam
Lathe, 46" 171" 6" Pond, p. c. g. triple grd. b.d.
Pipe cutting & threading machine, 6" Landis.
Press, hyd wheel, 300 ton Chambersburg, m.d.
Shaper, 24" Cincinnati, belt drive.
Shear, Alligator, No. 61 Carlin high knife, 21" sq.
Shear, 16" 14" United power squaring, m.d.
Slotter, 18" Newton heavy duty. md.
Straightener, No. 1 Shouter flat strip metal, m. d.
Upsetting machines, 24, 34, 4 and 5" Ajax iron bed,

#### FOR SALE BY

#### Lang Machinery Company

28th St. & A. V. R. R.

Pittsburgh, Pa.

Air compressors, Ingersoil-Rand XB-2, 600, 888, 1200 & 1500 cu. ft. 100 lb. pressure, motor drive.

Air comp. 14 'x12' Ing. Rand 'ER-1', 646 c. f., m. d. Bolt cutter, I' Ladni, 19'-3' egl. hd. b. d.

Bolt cutter, I' Acme, Landis head, 2 & 3 spdl.

Bolt cutter, I' Acme, Landis head, 2 & 3 spdl.

Bolt cutter, I' Acme, Landis head, b. g. b. d.

Bortug mil., 80' Bullard, threading attach. s. p. d.

Bortug mil., 42' Bullard, 2 swive theads, s. p. d.

Boring mil., 42'' Bullard, 2 swive theads, s. p. d.

Boring mil., 12'' Niles, 2 heads, frie, feed, b. d.

Boring mill, 12'' Niles, 2 heads, frie, feed, b. d.

Boring mill, horiz, 80' bar Barrett, b.d.

Boring mill, horiz, 8' bar Binsee, knee type, b. d.

Boring mill, horiz, 8' bar Binsee, knee type, b. d.

Boring mill, horiz, 8' bar Binsee, knee type, b. d.

Boring mill, horiz, 8' bar Niles, floor type.

Bar turning mch. Brightman, 6\(\frac{1}{2}\) 18' 18', m. d.

Bar turning mch. Brightman, 6\(\frac{1}{2}\) 18' 19', b. d.

Buffer & Polisher, 7\(\frac{1}{2}\) H. P. Marschke, 220'3'60.

Drill, noil, 8-spindle, Fox, b. d.

Drill, radial, 4' Ginchman! Dektord, t.a., m.d.

Drill, radial, 4' Ginchman! Dektord, t.a., m.d.

Drill, radial, 4' Ginchman! Dektord, t.a., m.d.

Drills, No. 1 Avey g. Sens, m. d., (2).

Drill, No. 3 Avey g., pnd., 12'' o. h., b. d.

Gear miller, No. 1 Bilton, range to 4'' dia. b. d.

Gear miller, No. 1 Bilton, range to 4'' dia. b. d.

Gear planers, bevel, 34'' Gleason, m. d., (2).

1760', p. m.

Grinder, dbl. end, 12'' Marschke, 2' H. P. 220 v. D. C.

1760', p. m.

Grinder, dbl. end, 12'' Marschke, 2' H. P. 220 v. d. c. Air compressors, Ingersoll-Rand XB-2, 600, 888, 1200 belt drive.
Lathe, 18"—48"x18' McCabe 2-spdl., int. dr., b. d.
Lathe, 17"x11' Le Blond, grd. hd., q.c.g., d.b.g., m.d.
Lathe, 27"x12' Putnam, hvy. duty, q. c.g., d.b.g., b. d.
Lathe, 28"x14'Schu. & Boye, hvy. duty, p. c. g., b. d.
Lathe, 28"x14'Schu. & Hvy. duty, d.b.g., q.c.g., b.d.
Lathe, 28"x14' S. & B. hvy. duty, d.b.g., q.c.g., b.d.
Lathe, 32"x16' Schumacher & Boye, p.c.g., d.b.g., b.d.
Lathe, 28"x18' American, p. c. g., t. a., b. d.
Lathe, 28"x26' 8" New Haven, p. c. g., b. d.

#### FOR SALE BY

#### C. R. Daniela

#### 1514 W. Capitol Drive, Milwaukee, Wis.

Drills, \$" Canedy Otto bench, motor drive, (2). Lathe, 14"x8" Hendey, q. c., cone drive, taper att. Lathe, 28"x16" Niles, l. c., cone drive, complete, Milling machine, No. 3 Cincinnati pl., cone drive Milling machine, No. 3 Cincinnati pl., cone drive Turret lathe, 2A Warner & Swasey, chucking only.

#### Reliance Machinery Sales Company 1407 Brighton Place, N.S. Pittsburgh, Pa.

Air compressors, 139 and 450 cu. ft.
Grinder, Bath 1232" univ.
Hammer, 390 lo. Bradley, upright helve.
Hammer, 390 lo. Bradley, upright, m. d.
Lathe, 21"x15" Reed-Frentice, arr. m.d.
Miller, 30"x10' Newton planer type.
Miller, No. 7-H Becker Lincoln type.
Miller, No. 7-H Becker Lincoln type.
Plate planer, 26" Covington, m. d., 3-80-440.
Press, No. 214 Bliss, blanking, m. d.
Press, No. 32"C Toledo dbl. crank, 3" shaft, 44" wide.
Press, No. 32"C Toledo dbl. crank, 3" shaft, 44" wide.
Press, toggle drawing, No. 34 A Bliss.
Roller leveller, 54". Tr. -44" rolls, m. d.
Shear, 48"x3/8" plate, 24" gap.
Slotter, 15" Bement, crank, 36" rot. table.
Turret lathe, No. 9 B. & O., 3" hole.
What do you need? What have you for sale?

What do you need? What have you for sale?

#### Wm. C. Johnson & Sons Machy, Co. 1211 Hadley St., St. Louis, Mo.

Air compressors, 15 in stock,
Bolt threaders, 1", 14" & 2" Acme,
Boring mill, 6" = 8, 44 "Niles,
Boring mill, King 34", turret head,
Broach, 24 La Pointe of Hudson,
Drill, Natco 13 spindles, No. 1 taper,
Drill, No. 2 Fox, 6 spindles,
Drill, Moline hole hog, 5-sp. No. 4 Morse taper,
Drill, radial, 4" Fosdick: 23" Mueller, 3" Reed-Prentice,
Orill, radial, 4" Fosdick: 23" Mueller, 3" Reed-Prentice,
Orills, radial, Drillmaster, new,
Gearhobber, No. 3 Adams,
Grinders, 16"x36" and 6"x18" Landis,
Hammers, 300 lb. Beaudry, 75 lb. Bradley, 50 & 100 lb.
Little Giant. Hammers, 300 lb. Beaudry, 75 lb. Bradley, 50 & 100 lb.
Little Giant.
Lattle 15 diant.
Lattle 15 diant.
Lattle 15 "6" Greaves Klusena, q. c. g.
Lattle, 16" "16" Groves Klusena, q. c. g.
Lattle, 18" "16" South Bend, quick change gear.
Lattle, 28" 18' Cisco, g. h., t. a., like new.
Lattle, 24" 18' Cisco, g. h., t. a., like new.
Lattle, 24" 18' Cisco, g. h., t. a., like new.
Lattle, 24" 18' Schumacher & Boye.
Miller, Gin. production type, 57" x11" table.
Miller, No. 1 & American.
Miller, No. 2 Le Blond plain.
Miller, No. 2 Gincinnant plain.
Miller, 18 Rockford universal.
Pipe machine. 2" "4" "4" "4" "8" "4" "7"
Pipe machine. 2" "4" "4" "4" "8" "4" "4"
Presses, No. 2, 3 & 4 Marshalltown.
Presses, No. 3, 3 & 4 Marshalltown.
Presses, 18, hydraulis pount & counulator.
Roll, plate 18" "50" "24"
Poches, shears, bulldozers.
Testing machine. 199,000 lb. Riehle.
Toggle press, 467A Bliss.
Large stock guaranteed electric motors. Any size. Large stock guaranteed electric motors. Any size,

#### FOR SALE BY

#### J. L. Lucas & Son, Inc.

3 Fox Street Bridgeport, Connecticut Cornice brake, 10'x3/16" D. & K., arranged for belt

drive, net weight 11,000 lbs.

Press brake, 8'x3/16" Ohl., arranged for motor drive, net weight 24,000 lbs.

Press brake, 8'x1/4" Robinson, friction clutch pulley drive, double back-geared, net weight 70,000 lbs.

#### S. M. Regar Machinery and Mill Supplies Tampa.

Lathe, Bement Miles, l. c. g., 36" factory raising blocks, 44"x22" bed. Lathe, Gisholt, 24", hole in swindle 8". Lathe, National 18" production, hole in spdle, 18, cone head, (3). Hammer, Lingle 50 lb. power, arranged m. d. Hammer, Williams White. Yeakley type, 400 lb. pneum. Saw, cold, Higley m. d. No. 27-38", takes blade 33". Slotter, Bemeit Miles 16", circular table.

#### Machine Tools Sales Company 513 No. 17th St. Philadelphia, Pa. Cable Address: Machtool, Philadelphia

Cable Address: Machtool, Philadelphia
Air compressor, 888' IR. X-B-10. belted m.d.
Air compressor, 811' 16x9x10 Chi. Pneu, O-CB. J.
Automatic, § Cleveland Model A.
Bolt cutter, § Landis, geared mir, dr.
Boring mill, 80'-10' Bets vertical.
Boring mill, 80'-10' Bets vertical.
Boring mill, 80'-10' Bets vertical.
Boring mill, 80'-10' Stels vertical.
Boring mill, 80'-10' Stels vertical.
Boring mill, 80'-10' Stels vertical.
Grinder, 19''-36' Landis pl. self-cont.
Hammer, 1400 lb. Sellers steam forging.
Hammer, 400 lb. N. B. P. single frame forging.
Hammer, 400 lb. N. B. P. single frame forging.
Hammer, 300 lb. N. B. P. single frame forging.
Lathe, 36''-11' New Haven Eng., cone.
Lathe, 48''-11' New Haven Eng., cone.
Lathe, 28''-14' Bridgetord plain turning.
Lathe, 70'-3 Haven Eng., cone.
Lathe, No. 3 Haven Eng., cone.
Lathe, No. 6-A Potter & J. auto.
Lathe, No. 18' Potter & J. Mig., spd.
Milling mch., No. 28' Pratt & W. dble, spdl.
Milling mch., No. 19' Potter & J. Mig., spd.
Milling mch., No. 19' Potter & J. Mig., spd.
Milling mch., No. 19' Potter & J. Mig., spd.
Milling mch., No. 19' Potter & J. Mig., spd.
Milling mch., No. 19' Potter & J. Mig., spd.
Milling mch., No. 18' Potter & J. Mig., spd.
Milling mch., No. 28' Potter & J. Mig., spd.
Milling mch., No. 28' Potter & J. Mig., spd. Miller, Thd. No. 27 Smalley Gen., 18" pot chuck, 29" deep, 10" hollow spindle.
Miller, Thd. No. 23 Smalley Gen., 6" spdl.
Planer, 34" 254" 215 Sellers, 3 heads.
Plate planer, 22" No. 2 Hilles & J.
Plate planer, 22" Southwark.
Punch, Camden dbl. end, stl. fr., 45" th.
Punch, Pels, RLUMS No. 26, 24" thr., cap. 14" thru
1", arch. Jaw. 1", arch. jaw
Punch. No. 6 Hilles & J. 62" thr.
Saw, 9" x9" Peerless.
Saw, 6" x6" Peerless. Slotter or vert. plan. mch., 72" Newton, m.d. Slotter, 9" Sellers.

Truck, 6,000 lb. Auto. Trans. 72" tier lift. Truck, 6,000 lb. Lakewood Eng. 60" tier lift. Truck, 6,000 lb. Baker, 60" tier lift.

#### FOR SALE BY

#### Davis Machinery Company

1-3-5 St. Clair St.

Toledo, Ohio

Drill, 3f' Fosdick radial, s.p.d. Grinder, No. 14 P&W vert. surf., ball bearing. Lathe, 32"x12' h s. & g., q.c.g. Grinder, No. 14 P&W vert, surf., ball bearing.
Lathe, 32"x12" h. & g., q. c.g.
Lathe, turret. No. 3 Foster, motorized.
Mill. No. 29 Ohio uni, complete, cone drive.
Mill. No. 2. B Milwaukee, dbl. o-a.
Mill. No. 5. B Becker vert, m. d.
Mill. No. 5. B Becker vert, m. d.
Mill. No. 5. B & S. univ, complete.
Mill. No. 18, & S. univ, complete.
Mill. No. 18, & S. univ, complete.
Saw. 636 Peerless shaping, motor dr.
Saw. 636 Peerless shaping, motor dr.
Screw machines: 32 Gridley sgl. spdl. m. d.
Thread miller, No. 3-C Lees Bradner, motor drive.

#### FOR SALE BY Chas. E. Lowe Co. 174 Pearl Street Hartford, Conn.

174 Pearl Street Hartford, Conn. Automatics & Turret Formers No. 2 B. & S., (18). New Britain-Gridleys, 1½", anti-friction throughout, rebuilt, motor in base, serial over 23090 (2). Gridleys, 1½" G. Timken spindles, rebuilt (2). Cieveland, 3½" A. motorised, 5 hole turret. Cue, 1½", 4% motorised, 5 hole turret. Cue, 1½", 4% motorised, 5 hole turret. Gridley, 9/18" G. motorised. See Hartford, 14% G. motorised. Chucker, No. 452 New Britain, 4 spindle, motorised. Chucker, No. 24 New Britain, serial 5149. 14x19 Fays, (4). Gridley, No. 15 Bryant chucking, internal. Grinder, No. 25 Baxter D. Whitney, internal. Grinder, No. 3 diamond surface, m. d. 16x36 mag, chck, Lathe, 44"x16" Pratt & Whitney, taper att.

#### Marr-Galbreath Machinery Company

Marr-Galbreath Machinery Company
Air compressor, 9x8" Ing. Rand., ER-1.
Air compressor, 9x8" Duplex, Curtis, m.d.
Air comp. 678 cu. ft. Ing. Rand, X R. 3/69/440.
Blowers, (furnace) No. 2 Knight; No. 3 American.
Blowers, (furnace) No. 2 Knight; No. 3 American.
Blowers, pressure, No. 11. PB Am. 18275 cfm., m. d.
Bort ing. 130" Builard vert, threading attach., b. d.
Boring mill, 30" Builard vert, threading attach., b. d.
Boring mill, yest., 30" King, tur. hd., s. p. d.
Brake, crimp and corrugating, 10" kls ga. Keene.
Brakes, apron, 10" 1/8" & 8" 12 ga., Chgo.
Brakes, apron, 8" x 16 ga. Tattle, hand.
Die filling machine. No. 2 Cochrane-Bly.
Drill, bryd, duty, 24" Mechanics, No. 5 klT, m. d.
Driller, horiz., 6 spindle Nat/1. Acme, No. 2 chucks.
Drills, radial, 3 Dresses, Simplex, come.
Exhauster, No. 35 Haffalo, outlet 12x14" m. d.
Forging machine, 1" Ajax, cont. motion, m. d.
Forging machine, 1" Ajax, cont. motion, m. d.
Forging machine, 14" Acme. all steel, side shear.
Gear pision, No. 35 loan & Chase, auto. bench.
Grinder, drill. 24" Oliver, m. d.
Grinder, portable surface, No. 8-OA, motor, 3/60.
Grinder, univ. C. & R. No. 3 B. & S.
Grinding spindle, Excello No. 89, bracket 802.
Hack saw, 6xe" Rerless, for me, with dies, belted,
Hammer, 800 lb. sgl frame, ateam.
Hammer, 800 lb. sgl frame, ateam.
Hammer, 800 lb. sgl frame, ateam.
Hammer, 150 lb. Erie, Arch frame, steam.
Hammer, 150 lb. Erie, Arch frame, steam.
Hammer, 160 lb. Lingle urpight power, belted,
Hammer, 180 lb. Lingle urpight power, belted.
Hammer, 180 lb. Erie, Arch frame, steam.
Hammer, 180 lb. Erie, Arch frame, steam.
Hammer, 180 lb. Lingle, chuck, cone.
Lathe, 11" 18" Ad Arisana, o. c. g., a. d.
Lathe, 11" 28" Awandana, o. c. g., a. d.
Lathe, 11" 28" Awandana, o. c. g., cone.
Lathe, 11" 28 Advance, chuck, cone.
Lathe, 11" 28 Advance, chuck, cone.
Lathe, 11" 28 Advance, chuck, cone.
Lathe, 10, 14" 18" 24" Arisana, o

#### 57 Water St., Pittsburgh, Pa.

Miller, No. 3‡ Fox, plain power feed, c.s. Motors, 15 h. p., West. 3/69/220—449.876 rev. Motors, 15 h. p., Allie-Chalmers 2/69/226/680 rev. Motors, 30 & 40 h.p., West., CS. 3/69/220/870 rev. Motors, 30 & 40 h.p., West., CS. 3/69/220/870 rev. Nailing machine, No. 6. Morgan, 8-track, m. d. Nibbling machine, No. 1 Campbell, 6" thr. 3/16", Pinion cutter, No. 3/50 and & Chase, capacity 121", Pipe machine, 4" Williams, cap. ‡" to 4", m. d. Pipe machine, 8" Jarceki, cone or m. d. Pipe machine, 8" Jarceki, cone or m. d. Pipe machine, 8" Jarceki, cone or m. d. Pipe machine, 4" 20 k., motor 1/60, 2". Pipe machine, 8" Jarccki, cone or m. d. Pipe machine, 18" Vicinal "Standard", m. d. Pipe machine, 18" Vicinal "Standard", m. d. Pipe machine, 402 Ost., motor 1/60, 2". Pipe & minple mach. 2" Landis dol. Ind. b.d. Planer, 28" 128" Niles, 1 Ind., belt m. d. Planer, 28" 128" Niles, 1 Ind., belt m. d. Planer, 28" 128" Niles, 1 Ind., belt m. d. Press, ponch, No. 34 Consolidated, plain.
Press, punch, No. 54 Consolidated, plain.
Press, punch type, No. 34 Consolidated pl.
Press, punch type, No. 34 Consolidated pl.
Press, punch type, No. 34 Consolidated pl.
Punch, S. E., 38" Cleve, E.F. 1817", A. J., dies, Punch & Shear, S. E., No. 7 L. & A., 5" tht. cap. 13", Punch & Shear, S. E., No. 7 L. & A., 5" tht. cap. 13", Punch & Shear, S. E., No. 7 L. & A., 7 pid s. Punch, state & riveter, 72" Wickes, 7/8" 3", s.p.d. Punch, state & riveter, 72" Wickes, 7/8" 3", s.p.d. Riveter, 3A h. d., cap. 5/16", high speed, s.p.d. Riveter, 3A h. d., cap. 5/16", high speed, s.p.d. Riveter, 103 Grant, m. d., 3/60/220 v., cap. 5/18", Rolls, 30" x8" United, 2-rolls (for leather). Saw, metal band, No. 4 Atkins, cap. 12 x18" m.d. Saw, friction, No. 0 Ryerson, 24" blade, m.d. Shaper, 18" Smith & Mills, m.d.
Shaper, 18" Smith & Mills, m.d.
Shaper, 18" Smith & Mills, m.d. Shaper, 15" Blount, single geared.
Shaper, 18" Smith & Mills, m.d.
Shapers, 21" Averbeck cone.
Shapers, 22" Merebeck cone.
Shapers, 24" Milwaukee & American, cone.
Shear, bar, No. 3 United, 24" blade, cap. 23" sq., m. d.
Shear, thore, No. 3 United, 24" blade, cap. 23" sq., m. d.
Shear, thore, No. 3 United, 24" cap. 1500 lb.
Shear, throatless, 10 gs., Marshalltown, m.d.
Tapping machine, 300 lb. Golomy hand power,
Tansmission, Reeves No. 00 E. (new)
Turbines, 100 lb. Economy hand power,
Transmission, Reeves No. 00 E. (new)
Turbines, 100 lb. p. Donomy hand power,
Turret lathe, 2" P. & J., thread att. chuck, b.d.
Turret lathe, 2" P. & J., thread att. chuck, b.d.
Turret lathe, 2" P. & J., 2" hole, cone.
Turret-acrew machine, 1"x18" P. & W. W. F., m.d.
Upsetter, 14" Acm., all steel, for m. d.
Welder, arc, 160 amps, a. c., Hampton (new).
Welder, spot, 5 KVA., Eisler, 8" arms.

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#### Factory & Mill Supply Co., Inc. 176 Federal St., Boston, Mass.

Boring mill, 76" Bullard vert., 2 swivel hds., m.d. Planer, 48"x48"x12' Betts, 3 heads, m.d.

#### Neiman Machine Works - Freeport, Ill.

Grinder, No. 69 Heald Cylinder.
Die heads, Modern (5); Pipe taps, Murchey. (5)
Hammer, No. 3A high-speed riveting
Machines and patterns, for iron barrel plugs. (3)
Shear, No. 60 Hiagara slitting. 100

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Coal conveyor, I drag line. Iron removal water treatment plant,

#### The Reeve-Fritts Company Chicago 28 N. Clinton St.,

28 N. Cinton St.,
Boring machine, No. 1 Barrett, 34" bar,
Drill, radial No. 3 Barnes, horis duplez.
Grinder, 27" Buffalo knife, automatic feeds.
Grinder, No. 3 Grand Rapids universal,
Hammer, 100 lb. Maver upright.
Saw, cold No. 18 Lee-Simplez, 54".
Saw, swing, 18" Porter.
Screw machine, 3" Cleveland Model "A".
Tapper, No. 1 Garvin vertical, 4"
Turret lathe, 19" P. & W., geared head.

#### Nelson Machinery Co., Green Bay, Wis.

Brake, Keene 16' Cornice, No. 114.
Compressor, IR Imp. 12x12, 78x12 Duplex 327, c.f.m., Drill, 28' Barnes, sliding hd., H. W. L.&G., p.f., bd.
Gear cutter, Reynolds 18' spur & spiral.
Hoist, 6 ton V & T. with trolley,
Planer, Lodge & Davis 28x28x6, belted.
Planer, Ohio 28x28x5' belted.
Punch, Reade, 36'' throat, plain, m.d.
Roll, Doty, with 3.7'' 3x6' 4' hand operated rolls.
Shear, Lennox circular cutting and beveling, belted.
Turret, Conradus 128'' 28', 3'' hole.

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Planer, 24"24"x6"Cioclonati, Planer, 30"x20"x18' Gray, 2 heada, Tool Grinder, No. 2 Sellers universal, Drill, Rocklord h. d., No. 5 taper, Grinder, No. 6 Sardner, m. d., 30" discs, Hand screw machine, No. 2 Foster, i.g.h., w.f. Honing machine, Hutto 2-spindle, m. Over 300 machines available.

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Drill grinder, Sellers 3" capacity.
Extractor, De Layal 28 Quart.
Gear cutters, Whiton No. 14 automatic, (2),
Lathe, 24" 3" Lodge & Shipley.
Lathes, 9" x14" Porter-Cable Mfg. (2).
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Shaper, 25" Capacity Capacit

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Drill press, Moine 6-spindle, hole hog.
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Miller, No. 2 Pratt & Whiney plain horizontal.

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Grinder, 16\*\* Bratt & Whitney vertical, late model.
Mill., Ingersoll, 38\*x24\*\* 7\* rail head, 2 side heads.
Mill., Ingersoll, 38\*x24\*\* 29\*, 4 rail hds., 1 side hd., m.d.
Mill., No. 2 Cempamith plain, cone drives.
Mill., No. 2 Oenterlein, motor drive, cone. Separator, magnetic, Stearns, m. d. Turret lathe, Gisholt, c.d., 21"x2\frac{1}{2}", t.a., p.r., r.p.d. tr. Turret lathe, J. & L., 3" x36".

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Turret Lathes, No. 1, 2 & 3 Woodstd, Garvin, B&O,

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Air compressors, 30 to 2500 cubic feet.
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Air compr. portable gas 1·R 150 cu. it.
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Boring mill, 12° Niles, 2 heads, b. d.,
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Bulldozers, Nos. 2, 4, 6, 9, 28, & 30.
Cusher, jaw, No. 4 Champion, b. d.
Die sinker, No. 2 Patt & Whitney, b. d.
Drill sharpener, Ing. -Rand "Leyner", 18°.
Drill, radial 6 Reed-Prentice, single pulley drive,
Drills, upright 10° to 36°.
Engine, gas, 26 horse power Bessemer. Drill, radiai 6 Reed-Prentice, aingle pulley drive. Drills, upright 19" to 36".
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Gear tester, bevel 18" Gleason.
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Grinder, internal, No. 60 Heald, b.d.
Grinder, internal, No. 60 Heald, b.d.
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Grinder, surface, No. 1 Diam. 14x34, mag. chuck, m. d.
Grinder, surface rotary, 8" Heald, b. d.
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Hammers, Nos. 25, 3 h. p., 239/3/60.
Hammers, Nos. 25, 3 h. p., 239/3/60.
Hammers, Nos. 25, 3 h. p., 249/3/60.
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Lathe, bench, 11"x4" South Bend, m. d.
Lathe, bench, 11"x4" South Bend, m. d.
Lathe, bench, 11"x4" South Bend, m. d.
Lathet, bench, 11"x4" South Bend, m. d.
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Lathet, 10"x10" Springfield, t. a., m. d.
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Boring Bar 3" Beaman & Smith Horizontal, Floor type

No. 1-1/2 Amer. Mill, 10x46" table, Div. Hd. Vise, cone hd. LaPointe-Hudson Broach, motor drive, cut keyways to 1-%-bro sq. holes to 3-1/2" across flats, 54" stroke

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Heads Q. C. Gear Freeds
BRAKE—LEAF TYPE
6' D. & K. "Chicago" No. 167
Motor Driven, Capacity 2"
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10' GO & Naw. M. Dr. Cap.
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No. 7 Ajax M. D. face of cross
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Span 62'1" 25 ton

& H 0 Volt D. C. 38'4" ton Span 230 Volt 0 ton Northern Span 230 Volt 56.5" Volt D

5 ton Auxiliary CRANES--GANTRY Link Belt, 100', Span 220 30 A.C. With 2 yd, Wilton Li

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1000 lb, to 8000 lb, Chamb, B.
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BONG TEST OPEN SIDE OF THE HOLD THE HOL 760 ton Southwars, Between Columns 3000 ton Southwark. Fer Press, 3 Column, 17" dia. Ferging

stroke between 30" da daylight PRESSES DOUBLE ACTING

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2 Toledo, 8" stroke, bolarea 21"x21"
ton Birdsboro, Tie Pod struction, 18" Stroke of akholder, 36" Stroke of No.162 250 ton Blankwith

50 ton Birdshoro, Tonstruction, 18" St Blankholder, 36" St Slide, 42"x42" Area holder, Equipped wit quette Hydr. Cushions 0, 4 Bliss, Tie Rod ( tion, 10" Stroke of holder, 14" Stroke of 34"x314" Area top of of Shankhed PRESSES SINGLE ACTING

STRAIGHT SIDE Between Unrights
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Between Unrights
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47" between Uprig 6" Stroke between Uprights

800 ton Verson, all steel, 9" Stroke, 45" Bolster plate, Tex Rope V Drive

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Bed area 22"x22"
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12" Str. 124" Bet. Uprights 12" Str. 124" PUNCH—BEAM

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Kling Beam Punch & Cop. Mch.,
Arr. for M. D. Cap. to cope or
notch 6" to 24" I-beams, Eqp.
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plate shr. 8" chan or I-beams
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HIBES & J. No. 7, 98" Betw.
Hous, 18" Thr., M.D., Cap. to
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12"x54"; finishing stand 2
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Sheet Bar and Skelp Mill with

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One 3 High Stands. One 2 with

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Cold. Complete
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132" Morgan. 74" Strake. Capacity 1-1" Plate

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## Sq. shear, 36" D.&K. belt dr.

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Rolls, Pyramid type. 10 x ½ x
Screw Machine, No. 2 Garvin;
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48" x 48" x 16' Pond Planer, H.D. 4 heads, Arr. M.D.

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14"x6' 6 16"x6' LeBlond 3 S.C.D. D.B.G.
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No. 4 Cincinnati Hi.P. Cone 3 S.C.D.D.B.G No. 4 Cinc. H.P. Cone Univ. 3 S.C.D., D.B.G. No. 2 Kempsmith Univ. Vert. Hd. No. 2 Kempsmith Cone, M.D. No. 3 Kempsmith Universal Cone No. 2 Hendey Universal S.P.D. No. 3 LeBlond Plain 3 S.C.D. Cone.

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New Schuchart & Schutte Hob Grinder (Barg). No. 16 Brown & Sharpe Plain. Diamond Face Grinder. Diamond Face Grinder.

No. 1 Diamond Surface Grinder.

No. 50, 550, 60, 65, 70 Heald Internal.

No. 75 Heald Internal.

6"x18" Landis Plain, Self Contained.

10"x36" Landis Plain, S.C.

53" Besley Ball Bearing Yert. Spindle Disc.

#### BORING MILLS

48" Bullard Cone. 60" Gisholt, P.R.T.

#### TURRET LATHES

No. 4 & 6 W & S Plain Cone Drive.

#### MISCELLANEOUS

2½" Landis Bolt Cutter. No. 4 & 5 Mitts & Merrill Keyseaters. Model W Cleveland Pch. & Shr. 60" thrt., M.D. 8"x%" Chicago Bending Brake. 6'x3/16" Chicago Bending Brake. 6'x3/16" Chicago Bending Brake.
No. 92D Toledo D.C. Press.
No. 4A High Speed Riveter New.
2-No. 35 Niagara Presses New.
No. 36 Niagara Press New.
10'x3/16" Sholl Power Squaring Shear M.D.
6'x6" Peerless Sheping Saw.
35 K. W. Federal Spot Welder.

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36" x 36" x 14' Detrick & Harvey Open Side Planer

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72" Gould & Eberhardt Gear Cutter

No. 6 Fellows Gear Shaper

6" Gleason Bevel Gear Generator

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Natco Horizontal 3 way drill-hydraulic feeds

24" x 14' Lodge & Shipley Engine Lathe-cone driven

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24" Cincinnati Crank, m.d., 1 head
24"x24"x10" Cincinnati, belt, 2 heads
30"x30"x8" Gravy, belt, 1 head
30"x30"x8" Pond, belt, 1 head
30"x30"x10" Cincinnati, belt, 1 head
30"x30"x10" Cincinnati, belt, 2 heads 30"x30"x10" Cincinnati, beit, 2 neaus 32"x32"x8" Gray, belt, 1 head. 36"x36"x10" Whitcomb-Bl., belt, 2 heads 34"x24"x8" Cincinnati, belt, 1 head 36"x36"x10" Cincinnati, belt, 1 head 36"x36"x10" Cincinnati, belt, 3 heads 42"x42"x20" Ohito, belt, 2 heads 54"x42"x12" G. A. Gray, rev. m.d., 4 hds. 60"x46"x12" is Niles, m.d., 3 heads 60"x60"x12" Niles, belt, 3 hds., box table

PIPE MACHINES

2 Bignall & Keeler, m.d., 2" cap. 2" No. 70 Jarecki, m. d. 2" Landis Dble. hd. Pipe & Nipple, cone 2" Merrill, m. d. 2" Saunders, m. d. 4" Eaton, Cole & Burham, belt No. 4 Bignall & Keeler, m.d. Bignall & Keeler, belt 8" Williams, s. p. d.

**PUNCHES & SHEARS** Cleveland Model EF S. E., 36" Cleveland EF D. D., 36" throat throat No. 3 Hilles & Jones, m.d., 36" throat No. 6 Long & Allstatter D. E., m.d No. 6 Long & Allstatter S. E., belt

RIVETERS

Hanna Bench Type, 8" throat Hanna Pedestal Type, 13" throat No. 2A, 3A, 5A, High Speed Riv. Hammers Chicago Pneumatic Riveter Shuster Riveting Hammer, belt

BENDING ROLLS

10' Niles, drop end housing, belt, 1" cap. 24' Niles, shipyard type, cap. 1" plate SHEET METAL MACHINERY No. 2 Southwark Rotary Shr., 30" th., 8 ga. Southwark Rotary Shear, 36" th., %" cap. Quickwork Circle Shear, cap. 18 gc. No. 34 Lennox Rotary Bevel Shr., ¾" cap.

MILLING MACHINES
No. 2 Milwaukee Universal "K" Type m.d.

Timken Bearings base, No. 3H LeBlond Plain, cone No. 3 Cincinnati Plain, cone No. 3 Cincinnati Piam, cone
No. 15 Garvin Plain, cone
No. 22 Garvin Vertical, s.p.d.
24" Cincinnati Plain Automatic, s.p.d.
48" Oesterlein Tilt. Off. m.d., Tim. Brgs.
C86A Newton 3 spindle Continuous
No.6 Whitney Hand

SHAPERS

32" Gould & Eberhardt, gear box 28" Gould & Eberhardt, cone

28" Ohio, cone 24" Cincinnati, cone 24" Gould & Eberhardt, cone

24" Rockford, cone 24" Rockford, gear box

24" Barker, cone 20" Smith & Mills, cone

20" Hendey, cone

TURRET LATHES AND SCREW MACHINES

No. 4A Warner & Swasey Universal, 4½" hole, m.d., Timken Bearings, covered hole, m.d., Timken Bedrings, covered ways, no side carriage
No. 2A, 3A W. & S. uni. m.d., chucking
No. 3 Cinci. Acme Uni., m.d., bar equip.
No. 2 Pratt & Whiney, cone, chucking
No. 4 Woods Tilted Turret, cone No. Biggs Hand Screw Machine, cone in biggs Hand Screw Machine, cone 2x12" Garvin Turret, cone 2x24" Jones & Lamson Geared Hd., bar fd. 2x26" Pratt & Whitney, cone, chucking 2½x26" Modern, cone, chuck 2 spindle Jones & Lamson Steel Hd. m. d. 3x36" Jones & Lamson Geared Hd., chuck 2 spindle 3x36" Jones & Lam. Gd. Hd., ck. 16" Warner & Swaav. cone.

Warner & Swasey, cone 18" Libby Type A Geared Head, m. d. 20" Cincinnati Acme, bar, cone 21", 24" Gisholt Tilted Turret, cone

GEARED HEAD ENGINE LATHES

60"x30" 6" Niles-Bement-Pond, s. p. d. internal geared face plate 60"x30" N.-B.-P., m.d., int. geared face plate 60"x27" 6" Niles-Bement-Pond, m. d., p.r.t., internal geared, late

36"x22" LeBlond, m.d., int. grd. face plate 27"x18" LeBlond, s.p.d., taper 25"x18" LeBlond, s.p.d., taper

26"x18' Bridgeford, m.d., taper 26"x16' Bradford, m.d., taper

24"x26' American, m.d., taper 24"x18' Lodge & Shipley, m.d., taper

24"x16" Axelson, m.d., taper 24"x15" Reed, var. speed m.d., taper

24"x15' Reed, var. speed m.d 24"x12' American, m.d., taper 21"x16' LeBlond, m.d., taper 21"x10' LeBlond, m.d., taper 20"x14' Hendey, m.d., taper 20"x14' American, m.d.

American, m.d. 20"x8" Greaves-Klusman, m.d., taper

18"x15' Lehmann, m.d., taper 18"x10' Hendey, m.d., taper 18"x12' American, m.d., taper 18"x8"

American, m.d., taper American, m.d., taper 16"x8"

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16"x6' Rockford 16"x8' Rockford 18"x6' Schumacher-Boye

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raised to 28"x10' Reed

18"x14' LeBlond, taper 19"x8' LeBlond 19"x12' LeBlond 20"x10' Davis

20"x10' Lodge & Shipley

20":10" Lodge & Shipley
21":x8" LeBlond, taper
21":x10" LeBlond, taper
21":x10" LeBlond, taper
22":x13" Niles
24":x10" Bridgeford
24":x11" LeBlond
24":x11" Chard
24":x12" American
24-48":x16" McCabe 2 in 1
24":x16" Schumacher-Boye
26":x18" Schumacher-Boye
27":x16" Bridgeford
36":x10" Schumacher-Boye
24":x24" Schumacher-Boye
27":x16" Springfield

42"x24' Springfield

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No. 496D Toledo Drawing, m.d., bolster 95x50", 111½" stroke, rated 350 tons No. 2881/4B Toledo D.C. Toggle Drawing, m.d., bolster 601/2x84", 15" stroke stroke, rated

m.d., Doister 09/280\*, 13" stroke, fated 325 tons
No. 94 Bliss Consolidated, 1½" stroke
No. 93A Toledo S. S. D.C., m.d., qrd., 3" st
No. 92B Toledo S. S. D.C., geared, 2½" st.
No. 54A Toledo S. Special, m.d., 3" stroke
DG53 Ferracute Redrawing, grd., 10" str.
S51 Ferracute D.C., 2" stroke
No. 50-436 Minster S.S. D.C., 4" stroke
No. 50 Bliss Stiles Type, 2" stroke
D2, DD2 Ferracute D.A. Drawing, 2" stroke
D2, DD2 Ferracute D.A. Drawing, 2" stroke
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31/2" Rhodes, belt 36" Niles, belt

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No. 1 Garvin Knee Type, belt No. 2, 2X Garvin Automatic No. 11S Rickert-Shafer Auto. Threading Machine, m.d., cap. %" to 1" Gaterman Oscillating Pneu. Tap., 34" cap. ½" Rickert & Shafer Vertical Tapper

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5 Webster & Perks 5 spindle Vertical Nut Tapper 6 spdle. I" Acme Semi-Automatic Nut Tap.

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I spindle No. 2 Allen
Henry & Wright Class B No. 2 taper
Henry & Wright Class K No. 2 taper
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2 spindle Allen No. 2 Taper
2 spindle Edlund No. 3 Taper m. d.
2 spindle Henry & Wright No. 2 taper
2 spindle HySpeed No. 2 taper, m. d.
2 spindle Leland & Gifford, No. 2 Taper
2 spindle Textile Horizontal m.d., tapper
3 spindle Denge No. 2 taper m.d.

2 spindle Textile Horizontal m.d., tapper 3 spindle Demco No. 2 taper, p.f. 3 spindle Edlund No. 2 Taper, m.d. 3 spindle Edlund & Gifford No. 2 Tap. tapp. 3 spindle Sipp No. 2 Taper, p.f. 4 spindle Allen No. 2 Taper espindle Edlund No. 2 taper, m. d. 4 spindle Edlund No. 2 taper, m. d. 4 spindle Fosdick No. 2 taper a spindle Henry & Wright No. 2 taper 4 spindle Henry & Wright No. 2 tap. 5 spindle Henry & Wright Cl. K. No. 2 tap. 6 spindle No. ½ Avey 6 spindle Henry & Wright No. 2 taper

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2½' Fosdick Plain, gear box 2½' Avey Sensitive 3' American Sensitive

Carlton Sensitive 4' Hammond Jack Knife, m. d. 4' Hammond Jack Knife, wall type 4' N.-B.-P. Semi-Universal, m. d.

4 N.-B.-P. Semi-Universal, m. a.
4 Ryerson Plain, gear box
5 American Triple Geared, gear box
5' Bickford Plain, d.c. drive
5' Cincinnati-Bickford, m.d. thru gear box
5' Dreses Plain, gear box, 15' column
5', 6' N.-B.-P. Semi-Universal d. c. m. d.
5', 6' N.-B.-P. Semi-Universal, gear box

5', 6' N.B.-P. Semi-Universal,
5', 6' N.B.-P. Semi-Universal,
6' Posdick Plain, cone
6' N.B.-P. Full Univ. m.d. thru gear box
7' Dress Plain, gear box

W. F. & John Barnes Horizontal

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20" Barnes All Geared-Self-Oiling 21", 24", 32" Aurora 21", 32", 36" Cincinnati-Bickford

21" 32", 30 21" Superior 21", 25", Weigel 22", 26", 28" W. F. & John Barnes

22", 26", 28 24" Hoefer 24" Rockford 25" Superior

No. 2, 4, 22 Colburn Mfg. D2, D4 Colburn H. D. No. 310, 314, 315 Baker H. D.

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D-31 Fox multiple drill, rectangular head, 16"x311'2" spindle centers. No. 2 Morse taper; 10 spindles, hand and power feed to head.

AUTOMATICS, %" B; and 2" modelA,

BOLT CUTTERS, 2" Landis; 3/4" Geometric

BORING MACHINES, HORIZONTAL, 3-B Binsee, 21/2" bar; No. 1 Barrett cylinder borer, 3-3/4" bar with special feed of 10 bar

DIES and MACHINES for rect. cans, inc. 61 Ams flanger: 72 Ams double seamer: 126CD Adriance double seamer; 281

Adriance gang slitter.

DRILLS, 36" Cincinnati, back geared sliding head, tapping attachment; 36" Snyder back geared; 4 ft. Dreses plain rader back geared; 4 ft. Dreses plain ra-dial gear box drive; No. 4 Quint six spindle turret drill; No. 4 Morse tapers. HAND SCREW MACHINES, Wells %" ca-

pacity. ENGINE LATHES, 18"x9' Bell semi quick change; 22"x10" Davis dble. back gear quick change; 38"x14' Fifield: 14"x8' Monarch, plain change; Several 9"x14"

Porter Cable lathes Back facing attach.
MILLING MACHINES, No. 3½ Pratt & Whitney duplex, 60" table, 27" extreme be-

MILLING MACHINES, No. 3½ Prott & Whit-ney duplex, 60" table, 27" extreme be-tween spindles; No. 1 Newton slab, 65" table feed; Model C Backer vertical. TURRET & MONITOR LATHES, two 21" Gisholt turrel tables, 3½" bore in spin-dles: two 3":38" lones & Lamson; 16" Dreses, Fox Monitor chasing bar; No. 1 Am. Tool & Mach., Fox Monitor chas-

PLANERS, 24"x6' Pond, one head; 36"x15' Betts two heads.

Betts two heads.

PIPE MACHINES, 3" Bignall & Keeler; 4"
Saunders; both belt drive.

SLITTER, Model G-36 Yoder gang slitter.

motor drive with straightening rolls; 6

sets cutters.

SAND BLAST, Type A Mott, 26"x42"x19",
cabinet used one day. With bag of grit.

SEPARATOR, 3 McKenzie chip production.

WELDERS, two Gibbs spot welders, 18" throat 12 KVA.

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Cleveland, model A, % & 11/4" Cleveland, Model C—11/4" Motor Drive Gridley, Model F, 4 spindle, % & 11/4" National Acme, 3" Model B 4 spindle

DRILLS, Allen H.S. B.B. 2 sp., P.f. No. 2M.t. Edlund, No. 1A, 4 spdl. P.f. No. 3 M.t. Foote-Burt, Heavy Duty No. 24 & 25 Deficance No. 112 Production, M.D. Baush & Natco Multiple spindles

GEAR CUTTERS, Brown & Sharpe No. 4-48" Cincinnati No. 4-36

GEAR HOBBERS, Lees-B. No. 5A

GRINDERS, Heald Nos. 55, 60, & 65 Landis, 10x24" plain, self contained Norton, 16x36" Crankshaft recruoti, 19839" Crankshaft Norton, 6x32, 10x18, 24 & 36" Plain Cincinnati Face Mill, Excello M.D. spalle, Wilmarth & M. No. 1 Universal Tool Hydraulie Vertical Brooch, Colonial 38" Str., 54" Daylight, 36"x36" Platen, M.D. LATHES, American 18"x8' Q.C. T.A. Cisco 14"x8' Q.C. Hendey, q. c. 16"x8' & 18"x10' M.D. Mulliner-Edlund 14"x6' Q.C.T.,A.

MILLS, Becker No. 5 Vertical Newton No. 2 Key Seat Pratt & W. 6x14" Thread, M.D. No. 33 Kempsmith Prod., with 6' table, M.D.

PLANERS, 36"x44"x10' Cincinnati, 2 heads Planers, 30"x30"x8' Smith-Silk, 1 head PRESSES, No. 731/2 Bliss, S.S., S.C., S.F. 3"

stroke 15 & 3C ton Lucas Forcing No.94 & 95 Bliss, Solid Back Toledo No. 661 & 663 Embossing

BENDING ROLLS, 98"x%" Niles, Initial type 74"x%" Hilles & Iones, M.D.

SHAPERS, 24" Rockford, M.D. SLOTTERS, 3½" Rhodes, M.D. 8" R.T. 5½" Industrial—18" Rotary Table 14" Sellers, 32" Rotary Table, M.D. TAPPERS, No. 1, 2 & 2X Garvin

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Automatics
Cleveland, Model A, B., C, 11/4" (13).
1/2" 5-spindle Cleveland, m.d. & m. (3)
Cleveland, Model C, 2" (2).
Cleveland, Model A, 2", S.S. (3).
New Britain 6 sp., 1", m.d. Cutoff.
New Britain Chucker, No. 24.

Drills Drills
2, 3, 4 spdle. H & W., Allen, Lel.-G., Avey (33),
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3' Amer. Hi Sp. Rad., motor on arm.
Pratt & Whitney dble. end, m.d. & m.
Moline Hole Hoq, various sizes, (5),
Leland Gifford, 2 spdle., p.f.
Fox, Mult. Spdle., with tapp. att. (4).

Gear Equipment No. 326 B. & S. Gear Cutter, m.d. & m. No. 36 ST G. & E. Auto., 4 spdl. Gr. R., m.d No 5A Lees-Bradner Gear Hobbers, (3).

No. 3 Bryant Chucking.
No. 12 Brown & Sharpe
No. 15A Bryant Chucking, Internal and Face. No. 60 Heald Internal, c/s. 20" Badger Face, hyd. feeds, trav. of tble. 44".

No. 11/2 Cincinnati Plain, c/s. No. 21/2 Rockford Plain Horiz.

Miscellaneous Miscelianeous Balancer, 18" Gis. Stat., a. m.d., 4-sp. head. Balancer, 18" Gisholt Static Vert. Bender, Wallace Hyd., cap. 3" rd. tubing. Bender, Wallace Hyd., cap. 3" rd. tubing. 180°, with mtr. Boltcutter, 2 sp., 44" cap. Landis ld. scr. att. Broach, V-18 American.

Chip Separator, McKenzie, m.d. Core Blower, No. 6 Demmler, (3). Die Sinker, No. 2 Pratt & Whitney. Die Sinker, No. 2 Pratt & Whitney.

Pipe Threader, No. 3 Wms., m.d. & M., 6" cap.

Polishers, U. S. Elect. Tool, m.d. in base.

4-brg., h.d. type, (16).

Punch, Model ID Cleveland Single End, m.d.,

cap., 2 holes, 1 thru 11½" 36" thr., lat. type.

Punch, Long & Alstatter, 40" throat.

Rivet Heaters, Berwick (4).

Saw, 6x6 Racine, Harb.

Saw, 6x6 Racine Hack. Shaper, 18" American Hydraulic. Shaper, 16" American Heavy Duty, m.d. & m.

Shaper, 16" American Heavy Duty, m.d. & m. Thrdx., No. 3 Manv., dble. spdle., a. hop. fds. Threader, Rick. & Sch. Horiz. with auto. index. Truck, 3-ton Automatic Low Lift. Truck, Elwell Parker Elect. Mule.

24"x24"x6' American.
36"x60"x14' Amer, wid. to 60", rail, inside hd.
42"x42"x12' Bedford Openside, m.d. & m.

No. 55½ Toledo Tie Rod, with dble. roll fds. No. 56 Toledo, S.S., Single Cr. No. 56 Toledo B.G. m.d.

24"x18' Prentice Lathe, geared head, taper attachment, spd.
Williams & White Gear Cutter, capacity including gears up to 98" diameter x 52" face Wire Str., %" Shuster, ext. for cut. to 20' lg. Wire Str., 3/16" Shu., ext. for cut. to 20' lg. (5).

No. 132 Arter Drum Type, m.d. (2). Norton Model B Tur. type, m.d. (2). No. 126 Gardner double spindle opposed type,

No. 126 Gardner double spindle oppos motor driven, hydraulic feed. Nos. 6, 12A, & 20 Bryant (12). No. 6 Besley Dble. disc Grinder 12" and 16"x36" Cinc. Pi. Cyl., (2). No. 2 Oakley Tool & Cutter, c's. No. 2 Norton Tool & Cutter, 4"x5". Lathes

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Nos. 5A, 6A P & J Auto., m.d.
214" Jones & Lamson Screw Machine.
Fay Automatic 14" standard.
14"x6" Walcott.
16"x12" Lodge & Shipley, q.c.q., t.a.
Lo-Swing, 60" bet. centers, 8" sw., (2). 16"x7" American, grd. hd.
20"x8" Lehmann.
21" & 24" Gisholt Universal Turret.
28"x10' Chard, heavy duty, t.a.
3x36.] & L Flat Turret, s.p.d.

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No. 5 Becker Brainard Horiz. Mill.
No. 5C Becker Vert.
No. 21 Brown & Sharpe Prod., s.p.d.
Nos. 1, 2 & 3 Craftsman Rot. Prod.
54" Ingersoll Rotary, 3 head, m.d.

54" Ingersoll Rotary, 3 head, 66" Newton Rotary, m.d. No. 1 Kempsmith Universal. Sellers Boring, 84" dia. work.

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Newton Spotting, m.d., 108" bet. uprights
No. 52 Toledo Arch, 29x29 bolster.
No. 4 Loshbough Jordan.
No. 63 Michigan S.S.
No 5 Canco, 8" str., S.S., Bk. Grd., m.d.&m.
No 24 Toledo cam draw., m.d.& m.
P.2, P-3, P-4 Ferracute. m.d. (12).
DG-53 Fer., S.S., S.C., B.G., G.M.D.
Nos. 3, 4, 5 Bliss Consl., m.d.
No. 6C Rockford dble. cr., S.S.

Upsetters l" National, steel bed.

Shears
6' 10 qa Bertsch.
No. 662 Niagara, 10 qa. 62", 15" qap.
No. 862 Niagara, 62" 3/16" cap., 15" qap.
10' %" Pexto Gap late type, m.d. & m. 10' 14 ga. Streine.

AND A COMPLETE STOCK OF FINE UP-TO-DATE EQUIPMENT

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314' Western Radial

4 Spindle No. 17 Foot Burt 2-3-4 Spindle Leland Giffords

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14"x6' American Gd. Hd. 16"x8' Springfield Gd. Hd.

18"x10' Mueller, Taper att. 20"x10' Whitcomb, Gd. Hd. 36"x14' Bridgeford Gd. Hd.

32"-64"x11' Fay & Scott Sliding Bed G. MILLING MACHINES

No. 4 Cincinnati

No. 5 Cincinnati 18" Cincinnati Mfg.

2" Pratt & Whitney Double Spline

GRINDERS

14"x36" Norton Hydraulic Multipurpose Universal

20"x96" Landis Universal

#### BORING MILLS

72" Bickford Vertical, 2 Hds. 72" Bullard, 2 Hds.

86" Bullard Vertical, 2 Hds

PRESSES 178 Toledo, Toggle M.D.

No. 4N Bliss M.D.

No 11/2 Bliss Cam Action 3-No. 2 Waterbury Farrell

8-No. 31 Waterbury Farrel TURRET LATHES

5A Potter & Johnston

24" Steinle, 61/4" hole 26" Libby

2 Spindle J & L Steel Head 11/2" Pratt & Whitney Bar Feed 21/4x24 Jones & Lamson

MISCELLANEOUS

No. 13 Brown & Sharpe Gear Cutter No. 4-48" Brown & Sharpe Gear Cutter 36B Gould & Eberhardt Gear Cutter 9"x9" Peerless Shaping Saw

No. 12 Pratt & Whitney Profiler 26"x26"x8' Woodward & Powell Planer

6" Campbell Nibbler 8" Standard Pipe Threader

#### Wigglesworth Machinery Company Cambridge, Mass.

#### TURRET LATHES

No. 9 Bardon & Oliver, 21/2" Capacity

No. 9 Foster, 2 13/16" Capacity No. 6 Warner & Swasev

1" x 6" Acme, Plain Head

No. 1 Brown & Sharpe, Motor Driven

#### MILLERS

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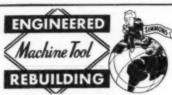
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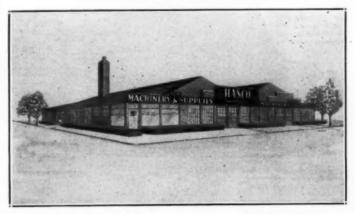
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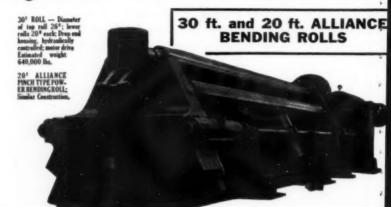
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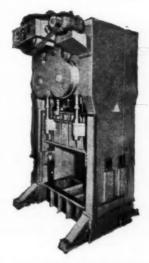
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No. 3 Wil. & Mor. auto., surf.
No. 78 W. & M. Auto. Surf. B.D.
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Cutter, Power Feed.
Cleveland Relief, M. D.
N. 70 Ha-Id list. elutch in hd.

No. 70 Heald Int., clutch in hd.

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Screw Mch. No. 1 B. & S. Hnd.

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6°x48¹ Pratt & Whitney Thread.
No. I B. & S. Plain, cone head.
No. I Kempamith Univ., B. G.
No. 1½ Garvin Universal.
No. 2A Becker Brainsrd Vert.
No. 10 P & W Hand.

No. 3 Kempamith Plain, Cone. 40° Gisholt Vert. Bor., arr. MD. PRESSES No. 104 Blies Cone. Dble. Crk. Back Geared. 2-7/8" str.

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Gear Cut. No. 3-26\* B. & S.
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20" drilla

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No. 4, Acme. Bar Feed
No. 4, B. 6 S. Wire Feed
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B. 6 O. Univ. Brass Lathe
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No. 4, Acme, Bar Feed

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20"x12' Hendey, Q.C.G., Cone
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Tone, raised in sand.
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Gear Hobbers, No. 12 Barber Coleman, P.RT. (2)
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Hammer, No. 3B Nazel, M.D.
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76"	Bulland

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				niversal.
14"	196" No	rton Fo	ice.	

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ACS Becker Continuous Vert.
Model C-2 Becker Vertical.
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No. 12 Pratt & Whitney Lincoln.
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38"x44"x20' Ingersoll Slab.
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24"x24"x6' Rockford.
24"x24"x6' Cincinnati.
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30"x30"x18' Cincinnati.
36"x36"x8', 18' Cincinnati.
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24"	Steinle, 614" H.S.		
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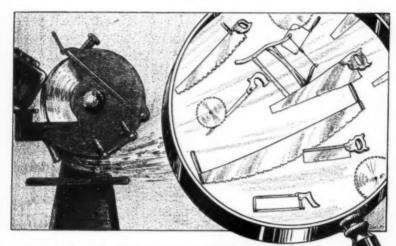
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